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Vol. 952 Number 4

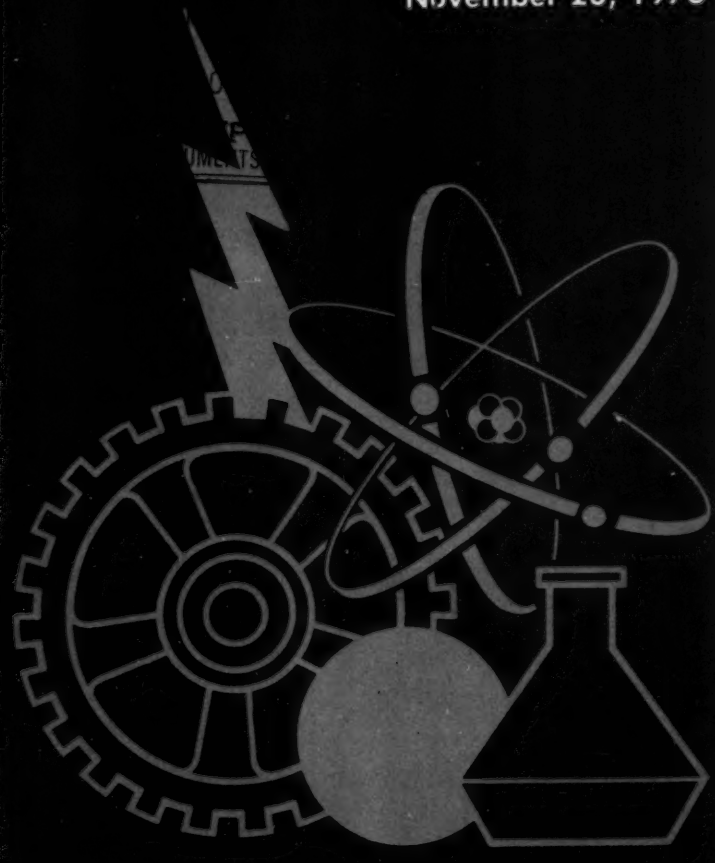
OFFICIAL GAZETTE

of the

UNITED STATES PATENT AND TRADEMARK OFFICE

PATENTS

November 23, 1976



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OFFICIAL GAZETTE of the UNITED STATES PATENT and TRADEMARK OFFICE

November 23, 1976 Volume 952 Number 4

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PATENT AND TRADEMARK OFFICE NOTICES

Report on Results of a Survey on the Citation by Applicants of Prior Art in Patent Applications

This report summarizes the data compiled from a sample of 1,600 allowed applications surveyed in the Office of Patent Program Control during the week of August 30 to September 3, 1976.

This report is being published in response to a number of inquiries relating to how many applicants are currently submitting prior art citations in their patent applications.

The statistics are presented without comment.

	Chem.	Elec.	Mech.	Total
(1) Number of applications in sample	476	486	638	1,600
(Percent of total)	30	30	40	
Number of applications having citations submitted in:				
(2) Separate papers only	39	37	57	133
(Percent of sample 2/1)	8	8	9	8
(3) Both separate papers and in specification	41	25	29	95
(Percent of sample 3/1)	9	5	5	6
(4) The specification only	246	157	239	642
(Percent of sample 4/1)	52	32	37	40
(5) Total number of applications having citations	326	219	325	870
(Percent of sample 5/1)	69	45	51	54

For this survey, "Prior Art" was defined as a specifically identified patent or publication which the applicant cited and considered to be sufficiently relevant that he at least included with the citation, either comments defining the claims over the prior art or a copy of the prior art document.

"Background material" was defined as a specifically identified patent or publication which was cited but not accompanied by either a comment defining the cited document over the application claims or a copy of the prior art document. It should be noted that such "background material" is usually found only in the specifications as filed.

Applications in which the applicant submitted citations in the *specification.*

	Chem.	Elec.	Mech.	Total
(6) Number of applications including citations in the specification of background material and/or prior art (Since some applications contain both types of citations, the statistics of (7) and (8) below overlap here)	287	182	268	737
(Percent of sample 6/1)	60	37	42	46
(7) Number of applications including citations of background material in specification	242	143	193	578
(Percent of sample 7/1)	51	29	30	36
(8) Number of applications including citation of prior art in specification	89	47	81	217
(Percent of sample 8/1)	19	10	13	14
(9) Number of applications citing prior art in specification which included copies of the cited documents	13	10	15	38
(Percent of No. citing prior art 9/8)	15	21	19	18
(10) Number of applications having citations of prior art in the specification and statements indicating pertinency and distinctness	89	45	81	215
(Percent of No. citing prior art 10/8)	100	96	100	99
(11) Number of applications citing prior art in the specification which comply fully with the guidelines for citation of prior art by applicants (926 O.G. 2, M.P.E.P. §707.05-(b).	17	10	11	38
(Percent of No. citing prior art 11/8)	19	21	14	18
(12) Number of applications citing non-English documents in specification	20	1	5	26
(Percent of No. citing prior art 12/8)	22	2	6	12
(13) Number of applications citing non-English documents in specification which included an English translation or English language equivalent document	7	1	0	8
(Percent of No. citing non-English documents 13/12)	35	100	0	31

Applications in which applicant submitted citations in *separate papers.*

	Chem.	Elec.	Mech.	Total
(14) Number of applications citing prior art in a separate paper	80	62	86	228
(Percent of sample 14/1)	17	13	13	14
(15) Number of separate *papers* filed citing prior art (Note that 245 papers were filed in 228 applications. Of these 228 applications, 213 had one paper, 13 applications had two papers and two applications had three papers.)	87	65	93	245
(16) Number of separate papers citing prior art submitted within 3 months of the filing date of the application	34	43	55	132
(Percent of total separate papers 16/15)	39	66	59	54
Number of separate papers citing prior art later than 3 months after the filing date and after the first Office action which:				
(17) Included a statement explaining why the prior art was not earlier presented	7	8	4	19
(Percent of total separate papers 17/15)	8	12	4	8
(18) *Did not include* a statement explaining why the prior art was not earlier presented	30	10	27	67
(Percent of total separate papers 18/15)	34	15	29	27
(19) Number of separate papers citing prior art which included a copy of the prior art	64	42	55	161
(Percent of total separate papers 19/15)	74	65	59	66
(20) Number of separate papers citing prior art which included a non-English document citation	27	4	10	41
(Percent of total separate papers 20/15)	31	6	11	17
(21) Number of separate papers citing a non-English document which included an English translation or English language equivalent document	11	2	2	15
(Percent of total non-English citations 21/20)	41	50	20	37
(22) Number of separate papers citing prior art accompanied by statement indicating the pertinency of the prior art	55	28	24	107
(Percent of total separate papers 22/15)	63	43	26	44
(23) Number of separate papers citing prior art filed after allowance of all claims	1	1	0	2
(Percent of total separate papers 23/15)	1	2		1
(24) Number of separate papers citing prior art which fully conformed with the guidelines	29	22	13	64
(percent of total separate papers 24/15)	33	34	14	26

Number of citations per application of background material.

	Chem.	Elec.	Mech.	Total
(25) Number of applications having 1-5 background material citations	175	126	172	473
(Percent of No. citing background 25/7)	72	88	80	82

	Chem.	Elec.	Mech.	Total
(26) Number of applications having 6-10 background material citations	38	14	18	70
(Percent of No. citing background 26/7)	16	10	9	12
(27) Number of applications having more than 10 background material citations	29	3	3	35
(Percent of No. citing background 27/7)	12	2	2	6

Number of citations per application of prior art in specifications.

	Chem.	Elec.	Mech.	Total
(28) Number of applications having 1-5 prior art citations in specification	73	47	69	189
(Percent of No. citing prior art in specification 28/8)	82	100	85	87
(29) Number of applications having 6-10 prior art citations in specification	13	0	10	23
(Percent of No. citing prior art in specification 29/8)	15		12	11
(30) Number of applications having more than 10 prior art citations in specification	3	0	2	5
(Percent of No. citing prior art in specification 30/8)	3		3	2

Number of prior art citations per separate paper.

	Chem.	Elec.	Mech.	Total
(31) Number of separate papers having 1-5 prior art citations.	65	43	56	164
(Percent of separate papers 31/15)	75	66	60	67
(32) Number of separate papers having 6-10 prior art citations	15	17	20	52
(Percent of separate papers 32/15)	17	26	22	21
(33) Number of separate papers having more than 10 prior art citations	7	5	17	29
(Percent of separate papers 33/15)	8	8	18	12

Dated: October 26, 1976.

C. MARSHALL DANN,
Commissioner of Patents and Trademarks.

PATENT AND TRADEMARK OFFICE
Board of Appeals

In accordance with the provisions of 35 U.S.C. 7, as amended by Public Law 93-601, vacancies on the Board of Appeals are filled by appointment of examiners-in-chief under the classified civil service. These appointments will be made at a salary of $39,600 per annum.

Persons interested in being considered for this vacancy are invited to submit their applications to the address given below, on or before December 3, 1976. The duties, qualifications, and factors which will be considered in evaluating the candidates are described below.

Duties: Serves as a member of the Board of Appeals of the Patent and Trademark Office. As an examiner-in-Chief, participates in its appellate and administrative responsibilities and exercises independent judgment on all matters before him on appeal subject to administrative and policy direction of the Commissioner. Appeals filed in accordance with 35 U.S.C. 134 and 37 CFR 1.191 through 1,198 of the Rules of Practice of the United States Patent and Trademark Office in Patent Cases involve complex legal and technical questions. The Board of Appeals has the sole power to hear and adjudicate appeals from decisions of the Primary Examiners as to patentability in applications for patent and for reissue of patents. Final decisions of the Board, if unfavorable to an applicant, may be appealed to the United States Court of Customs and Patent Appeals or civil action may be taken in accordance with 35 U.S.C. 145.

Qualifications: Candidates must possess (1) a minimum of five years of patent experience of which at least two years involved the exercise of independent judgment in a responsible position as typified by the exercise of Full Signatory Authority as a Patent Examiner or by comparable experience in some other position inside or outside the Patent and Trademark Office; (2) a law degree or be a member in good standing of the bar in any state, D.C., Puerto Rico, or any territorial court under the constitution: (3) a high degree of demonstrated competence in chemical technology; (4) ability to write clearly and logically; (5) comprehensive experience in patent prosecution, examination or administration which demonstrates a thorough knowledge and application of patent laws and rules of practice.

Factors Which Will be Considered in Evaluating Qualified Candidates: Candidates will be evaluated on the total range of their education, training and experience as well as supervisory appraisals of past performance and potential. *Note:* The qualifications of the proposed incumbent will have to be reviewed and approved by the Department of Commerce and by the U.S. Civil Service Commission before an appointment can be made effective.

Employees of the Department of Commerce may apply by submitting a completed Merit Promotion Interest Statement, Form CD 261, and a completed SF 171, Personal Qualifications Statement, if one is not already on file at the address given below. Persons who are not employees of the Department of Commerce should submit only a completed SF 171. Copies of Form SF 171 may be obtained at local post offices. The completed forms should be sent to:

U.S. Patent and Trademark Office
Office of Personnel
Building 2, Room 9C05
Crystal Plaza
Arlington, Virginia 22202

Questions concerning this notice should be directed to Ms. Margaret M. Mazza, Office of Personnel, Room 2-9C05, Telephone (703) 557-7624.

C. MARSHALL DANN,
Commissioner of Patents and Trademarks.

October 1976.

Patent Suits
Notices under 35 U.S.C. 290; Patent Act of 1952

2,647,590, C. A. Anderson, Jr., HYDRAULIC ELEVATOR, **filed** Oct. 2, 1972, D.C., N.D. Ill. (Chicago) Doc. 72c2456, *Advance Hydraulics, Inc.* v. *Eaton Corp.* Memorandum opinion and order, plaintiff's retroactivity argument is found to be without merit. Therefore, in the case at bar, summary judgment is appropriate on the equitable defense of laches, June 16, 1976.

2,712,584, S. Pantages, POTENTIOMETERS; **2,745,915**, same, MULTIPLE REMOTE CONTROL SWITCH, **filed** May 12, 1975, D.C., S.D.N.Y., Doc. 75-C-2246, *Steven Pantages* v. *Litton Industries, Inc., Joseph R. Altieri and James M. Weidman.* Complaint is dismissed as against all defendants, June 3, 1976.

2,745,915. (See 2,712,584.)

2,822,682, L. D. Sollenberger, WEATHER-TIGHT ENCLOSURE; **3,056,544**, Sollenberger and Sciacero, PARKING METER LOCKING MEANS, **filed** Nov. 26, 1973, D.C.N.J. (Trenton) Doc. 1688-73, *American Parking Meter Company* v. *Duncan Industries.* Consent order of dismissal of action, May 28, 1976.

2,887,674, G. B. Greene, PULSE WIDTH MEMORY UNITS, **filed** Apr. 29, 1974, D.C., N.D. Ill. (Chicago) Doc. 74c1181, *Electronic Processors, Incorporated* v. *Redactron Corporation and Data General Corporation.* The court hereby finds that the defendant on the plaintiff's complaint, and for the plaintiff/counter-defendant on the defendant/counter-plaintiff's counterclaim holding that both the Greene and Wolf patents are invalid by reason of obviousness, June 18, 1976.

2,972,349, R. A. DeWall, CAPILLARY OXYGENATOR, **filed** Oct. 17, 1973, D.C. Del. (Wilmington) Doc. 4744, *The Regents of the University of Minnesota and Dow Chemical Company* v. *Romicon, Inc. and Amicon Corporation.* Stipulation and order filed dismissing this case, June 16, 1976.

3,956,066, J. J. Dozier, IGNITION SYSTEM FOR INTERNAL COMBUSTION ENGINES, **filed** May 29, 1975, D.C. (District of Columbia), Doc. 75–0877, *James J. Dozier* v. *AMC.* Stipulation of dismissal and order of dismissal as to defendant General Motors Corp., Dec. 1, 1975; cause dismissed as to American Motors Corp. without prejudice, Jan. 23, 1975, case dismissed with prejudice as to defendant Chrysler Corp. per plaintiff, Jan. 27, 1976.

3,956,544. (See 2,822,682.)

3,958,882, Sturm, Siedel and Weyer, N'-SUBSTITUTED-3-CARBOXY-6-HALO-SULFANILAMIDE AND DERIVATIVES THEREOF, **filed** May 28, 1976, D.C. Del. (Wilmington) Doc. 76–185, *Hoechst Aktiengesellschaft* v. *IMS Ltd., also known as International Medication Systems, Ltd.* Dismissal by plaintiff under Rule 41(a), F.R.C.P., June 17, 1976.

3,990,215, K. I. J. Rosen, DEVICE FOR GUIDED FEEDING OF YARN TO KNITTING MACHINES; **3,243,091,** same, YARN FEEDING EQUIPMENT, **filed** June 7, 1976, D.C.S.C. (Columbia) Doc. 76–1025, *AB Iro, AB Iro Distributing Corporation, Ltd. and Karl Isac Joel Rosen* v. *Fuji Electronic Industrial Co., Ltd.*

3,146,709, Bass and Kirby, METHOD AND APPARATUS FOR MOUNTING PRINTING SLEEVES, **filed** June 17, 1976, D.C.N.J. (Newark) Doc. 76–1163, *Mosstype Corporation* v. *West Essex Printing Plates, Inc.*

3,184,314, Forest and Czarnetzky, METHOD FOR THE PRESERVATION OF SILAGE, **filed** June 7, 1976, D.C., E.D. Mich. (Detroit) Doc. 76–71147, *International Stock Food Corp.* v. *American Agricultural Products Inc. and Ronald R. Mida.* **Same, filed** May 27, 1976, D.C., N.D. Ohio (Akron) Doc. C76–160A, *International Stock Food Corporation* v. *Dalton Equity Co. and Wooster Equity Co.*

3,211,211, W. R. Youngs, AIRCRAFT HANGAR AND DOOR, **filed** June 7, 1976, D.C., N.D. Ill. (Chicago) Doc. 76c2091, *R. L. Kuss & Co.* v. *Channon Corp.*

3,222,715, E. J. Harris, APPARATUS FOR LOADING GREEN TIRES IN A TIRE PRESS; **3,223,767,** same, METHOD OF LOADING A TIRE IN A TIRE PRESS, **filed** Dec. 7, 1972, D.C., N.D. Ohio (Cleveland) Doc. C72–1310, *Edward J. Harris* v. *NRM Corp., Condeo Corp., United Brands Co. and Goodyear Tire & Rubber.* It is ordered that judgment is hereby entered in favor of defendants, NRM and Goodyear on the complaint of infringement, and in favor of plaintiff on the counterclaim of defendants, June 10, 1976.

3,223,767. (See 3,222,715.)

3,243,091. (See 3,090,215.)

3,252,220, H. A. Goddard, ARTIFICIAL DENTURE, **filed** June 3, 1976, D.C., C.D. Calif. (Los Angeles) Doc. CV 76–1776–ALS, *Dental Prosthetic System, Inc.* v. *Swissedent Corp. and John Frush.*

3,257,522, A. F. Raab, LINK AND SWITCH DEVICE FOR AUTOMOTIVE BRAKING SYSTEMS, **filed** Apr. 24, 1972, D.C., E.D. Wis. (Milwaukee) Doc. 72–C–228, *Wells Mfg. Corp.* v. *Littlefuse, Inc.* Decision and order granting plaintiff's motion for summary judgment, further ordering that a declaratory judgment be entered adjudging that said patent is not contributorily infringed by plaintiff's sale of said brake switch, Nov. 21, 1975.

3,263,678, Joseph H. Everston, THERAPEUTIC BATHTUB HAVING PLURAL ASPIRATING FITTINGS, **filed** June 15, 1976, D.C., N.D. Ill. (Chicago) Doc. 76c2219, *The Celotex Corporation* v. *The Jacuzzi Research, Inc.*

3,280,891, Eldredge, Jr., Kirtley, Grusin and Logan, VERTICAL VENETIAN BLIND TRAVERSE APPARATUS, **filed** Mar. 25, 1976, D.C., N.D. Ill. (Chicago) Doc. 76c1158, *Gerald M. Grusin and James E. Logan* v. *Braber Company et al.* Order of dismissal with prejudice, June 11, 1976.

3,486,283, R. W. Arnett, SOFFIT MOLDING; **3,606,714,** same, MOLDING STRIP FOR USE AS QUIRK OR REVEAL, **filed** June 8, 1976, D.C., N.D. Ga. (Atlanta) Doc. C76–992A, *Fry Reglet Corporation and R. W. Arnett* v. *R. G. Barnett Corporation, R.G. Barnett and Elaine Barnett.*

3,528,428, B. Berkovits, DEMAND PACE, **filed** Sept. 30, 1974, D.C., E.D. Wis. (Milwaukee) Doc. 74–439, *American Optical Corporation* v. *General Electric Company.* Stipulation and order dismissing action, including counterclaim, without prejudice, Dec. 2, 1975.

3,568,924, L. H. Chenault, SNOW MELTING SYSTEM, **filed** June 9, 1976, D.C., E.D. Wis. (Milwaukee) Doc. 76–401, *Hume Snow Melting Systems, Inc. and Lawrence H. Chenault* v. *Grunau Company, Inc.*

3,570,014, W. D. Hancock, STENT FOR HEART VALVE, **filed** June 8, 1976, D.C., N.D. Ill. (Chicago), Doc. 76c2103, *Hancock Laboratories, Inc.* v. *American Hospital Supply Corporation.*

3,606,714. (See 3,486,283.)

3,753,364, Runyan and Grover, HEAT PIPE AND METHOD AND APPARATUS FOR FABRICATING SAME; **3,788,388,** H. G. Barkmann, HEAT EXCHANGE SYSTEM; **3,805,184,** G. M. Grover, HEAT PIPE AND METHOD AND APPARATUS FOR FABRICATING SAME, **filed** June 10, 1976, D.C., N.D. Tex. (Fort Worth) Doc. CA–4–76–164, *Q-Dot Corporation* v. *Container Corporation of America.*

3,788,388. (See 3,753,364.)

3,851,609, L. S. Stearn, TWO GROOVE HEADSTAY, **filed** June 9, 1976, D.C. Mass. (Boston) Doc. 76–2266–T, *Hood Sailmakers, Inc.* v. *Leathem S. Stearn.*

3,853,217, Scordato and Cohen, PIPETTE TIP PACKAGE, **filed** May 21, 1975, D.C., N.D. Ill. (Chicago) Doc. 75c1636, *Medical Laboratory Automation, Inc.* v. *Robert A. Stough & Company.* Pursuant to stipulation, enter final judgment on consent and dismiss said cause with prejudice, June 4, 1976.

3,857,803, R. S. Shenfeld and O. E. Brown, Labeling Adhesive, **filed** June 8, 1976, D.C. Minn. (Minneapolis), Doc. 3–76–200, *H. B. Fuller* v. *Borden, Inc.*

3,865,184. (See 3,753,364.)

3,867,991, R. I. Brandli, SHOCK ABSORBING SUSPENSION SYSTEM FOR A SNOWMOBILE, **filed** June 15, 1976, D.C. Minn. (Minneapolis) Doc. 4–76–C–258, *Martin P. Hoffman* v. *Textron Inc. and Ronald I. Brandli.*

3,872,554, Wolferts, Kramer, and Hillringhaus, CLOSURE FOR ARTICLES OF CLOTHING VALISES, POCKETS OR THE LIKE WITH OVERLAPPING CLOSURE PARTS, **filed** June 16, 1976, D.C.N.J. (Newark) Doc. 76–1153 *Berkeley Park Clothes, Inc.* v. *Firma Schaeffer-Homberg GmbH.*

Re. 25,536, D. T. Thompson, APPARATUS FOR MAKING AN ANNULUS, **filed** June 18, 1976, D.C., N.D. Ohio (Cleveland) Doc. C76–608, *Thompson Bagel Machine Manufacturing Corp.* v. *Amster Bagel Machine Co., Inc.*

Re. 27,970, L. W. Johnson, ROCK CRUSHER, **filed** Apr. 16, 1974, D.C., N.D. Ill. (Chicago) Doc. 74c1058, *Louis W. Johnson* v. *Barber-Green Company.* Enter consent judgment, Mar. 31, 1976.

D. 219,118, Baker and Plecia, BOAT; **D. 227,708,** same; **D. 229,103,** Baker, Plecia and Ferguson, BOAT UPPER SHELL; **D. 229,104,** same, **filed** May 30, 1975, D.C., E.D. Wis. (Milwaukee) Doc. 75–301, *Sidewinder Marine, Inc., Shasta Fibre Glass Corp. and Saul Davidson* v. *Sidewinder of Wisconsin, Inc., Thompson Boat Co. and Saul Padek.* Stipulation and order dismissing action on the merits and with prejudice, Oct. 23, 1975.

D. 227,708. (See D. 219,118.)

D. 229,103. (See D. 219,118.)

D. 229,104. (See D. 219,118.)

D. 230,658, W. R. Powell, MATERIAL HANDLING BOX; **D. 233,181,** same, STACKABLE MATERIAL HANDLING BOX, **filed** Oct. 14, 1975, D.C., E.D. Wis. (Milwaukee) Doc. 75–587, *Powell Pressed Steel Company* v. *Triple E Corporation.* Action dismissed without prejudice, Nov. 7, 1975.

D. 233,181. (See D. 230,658.)

D. 237,121, M. J. Metzner, TOOL CHEST OR SIMILAR ARTICLE, **filed** Feb. 10, 1976, D.C., N.D. Ill. (Chicago) Doc. 76c486, *Glovemakers, Inc.* v. *Harben Co. etc.* Ordered that the above cause of action be and it is hereby dismissed with prejudice, June 17, 1976.

XEROX LICENSE OFFER

This notice is published pursuant to a CONSENT ORDER TO CEASE AND DESIST dated July 29, 1975 between Xerox Corporation and the Federal Trade Commission.

TERMS *contained in this notice are defined in the Consent Order. All interested parties should refer to that document for the definitions and additional details of Xerox' patent and know-how licensing obligations thereunder.* A copy of the Consent Order and a list of PATENTS licensed to Xerox which are subject to the provisions of paragraphs II and IV (C) (9) of the Order, if any, are available from Xerox upon written request. All such requests and any request relating to the licensing of PATENTS and the licensing and disclosure of KNOW-HOW pursuant to the Consent Order should be made in writing and addressed to:

The Manager of Patent Licensing
Xerox Corporation
Stamford, Connecticut 06904

Xerox shall in accordance with the terms of the Consent Order:

(1) Grant licenses under
  (a) its ORDER PATENTS to make, have made, use and vend OFFICE COPIER PRODUCTS under the terms of the Consent Order, and
  (b) patents which are required to be licensed pursuant to the terms of paragraph X of the Consent Order, if any, and

(2) Disclose certain written materials as provided in the Consent Order [KNOW-HOW] to any LICENSEE of its United States ORDER PATENTS for use in connection with the manufacture of OFFICE COPIER PRODUCTS in the United States upon payment of the cost of collection and duplication of the requested materials.

The following is a list of patents which is believed to include all of the PATENTS available for licensing in accordance with the terms of the Consent Order. Fuji Xerox, Ltd. patents which also make up part of the list are grouped separately. There also follows a classification index for use in conjunction with the classification data appearing in the patent list to identify the category of the patent and a schedule of foreign countries and their corresponding key letters which are used in identifying corresponding foreign patents in the list. Since the classification system is not restricted solely to OFFICE COPIER PRODUCTS there are several patents included in the list to which the Consent Order is not applicable.

LIST CLASSIFICATION

The Patents are listed in numerical order according to their class assignment. For example, all U.S. patents classified as 1(A) appear at the beginning followed by those classified as 1A1, 1A1A, 1A1B, etc. The left-hand column shows the U.S. patent number. To the right of the U.S. patent number is its title followed by its issue date. Following the U.S. patent issue date is a list of the foreign patents based on the U.S. patents. An example of how the list should be used is as follows:

Under Class 1A which is entitled "Electrostatographic Systems, Imaging Systems—Distinctive Photosensitive Members Imaged", two U.S. patents are listed—2,573,881 which issued November 6, 1951 with corresponding patents in Australia, Canada, Germany, Great Britain, Switzerland and Sweden, and 3,877,936 which issued April 15, 1975 with a corresponding patent in Belgium.

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     6. Multilayered Members (Support-Intermediate Layer-Photoconductor)
   - B. Imaging Systems—Imaged Non-Photosensitive Members
     1. Non-Photosensitive Members
     2. Induction Imaging Systems
     3. Xeroprinting Systems
     4. TESI Printing Systems
        - a. Method
        - b. Apparatus
   - C. Imaging Systems with Variation in Final Copy
     1. Imaging Systems with Size Reduction
     2. Imaging Systems with Enlargement
     3. Half-tone Imaging Systems
     4. Deformation Imaging Systems
        - a. Frost
        - b. Relief
     5. Reversal Printing Systems
   - D. Duplex Imaging Systems
   - E. Color Xerographic Systems
   - F. Imaging Systems for Preparing Duplicating Masters
   - G. Imaging Systems—Distinctive Development Systems
     1. Magnetic Recording Systems
     2. Multiple Copying Systems with Partial Transfer
     3. Imaging Systems Employing Adhesive Transfer Web
     4. Imaging Systems Employing Toner Coated Plates
     5. Imaging Systems Capable of Development in Ambient Light
     6. Imaging Systems with Liquid Polar Ink Development
   - H. Display Systems with Imaging Capability
     1. Projection of a Xerographic Image (PROXI)
     2. Pin Matrix
   - I. Imaging Systems with Image Enhancement
   - J. Electrostatographic Apparatus
     1. Total Reproduction Systems
     2. Cameras
     3. Variable Imaging Speed
     4. Moving Document Reproduction
     5. Flat Plate Electrostatographic Apparatus
     6. Flexible Electrostatographic Apparatus
     7. Count Control Apparatus
     8. Developer Dispensing and Control Apparatus
   - K. Miscellaneous Methods and Apparatus
     1. Electrometers
     2. Reflex Imaging Systems
     3. Resist Formation System

2. DISTINCTIVE PHOTOSENSITIVE MEMBERS
   - A. Photosensitive Members—Novel Compositions
     1. Inorganic
        - a. Selenium
        - b. Alloys of Selenium with Arsenic and/or Antimony
        - c. ArS and Combinations Thereof with Selenium
        - d. Group III A Phosphides (Ga, Al or B)
        - e. Chalcogenides (Compounds Containing O, S, Se, or Te)
          - (1) ZnO
          - (2) PbO
        - f. Dye Sensitized Inorganic Photoconductors
        - g. Inorganic Photoconductors in Glass Binders
     2. Organic
        - a. Photosensitive Organic Compounds in a Binder
        - b. Lewis Acid Charge Transfer Complexes
   - B. Multi-Layered Photosensitive Members
     1. Members Having Subadjacent Barrier Layers
     2. Members Having Protective Overlayer
     3. Members Having Electroluminescent Layer
     4. Members Having Releasable or Soluble Layer
   - C. Deformation Imaging Members
   - D. Fibrous Photosensitive Member
   - E. Photosensitive Members—Novem Fabrication Techniques and Configurations
   - F. Apparatus for Alignment of Photosensitive members

3. CHARGING SYSTEMS
   - A. Induction Charging Systems
   - B. Non-Uniform Charging Systems
   - C. Corotron Charging Systems
     1. A.C. Charging
     2. Negative Charging
     3. With Fringe or Needle-like Electrodes
     4. Scorotron Charging
     5. Bipolar Charging
     6. Charge Level Smoothing
     7. Toner Dust Control
     8. Charge Sensing to Terminate Charging

9. Transfer From Intermediate Insulating Member

D. Charging Across a Liquid Layer

E. Charging a Semiconductive Photoconductor

F. Charging Including Illumination of Photoconductor

4. OPTICAL IMAGE FORMATION AND PROJECTION

A. Illumination of Original

1. Light Sources and Method of Illumination
2. Document Holders
   a. Platen Covers
3. Illumination Control Systems

B. Projection of Optical Image onto Photoresponsive Member

1. Scanning Systems—In General
   a. Distinctive Optical Scanning Systems
      (1) Lens Strip
      (2) Fiber Optics
      (3) Half Tone Projection Systems
      (4) Fresnel Lens
2. Simultaneous Charging and Projection of Optical Image
3. Distortion of Optical Image (e.g., for Coding Purposes)
4. Full Frame Exposure
5. Reflex Exposure
6. Projection with Variable Magnification
   a. Magnification with Fixed Optical Path Length
7. Projection of Composite Image

C. Control of Image Contrast

5. LATENT IMAGE DEVELOPMENT SYSTEMS AND COMPOSITIONS

A. Powder Cloud Development

1. Aerosol Development Methods and Apparatus in General
   a. Plate Development Apparatus
2. Cloud Charging Methods and Devices
3. Specific Toner and/or Gas Supply Devices and Methods
   a. Belt and Porous Material Toner Supply Device
   b. Cloud Directing Devices and Methods
4. Induction Development
5. Cleaning Devices
6. Charcoal Development Method

B. Fibrous Brush Development Devices and Methods

C. Magnetic Brush Development (Dry)

1. Magnetic Brush Development Methods and Devices
   a. Magnetic Belt Devices
   b. Loading Devices
2. Color Producing Development
3. Single Component Magnetic Developer

D. Cascade Development

1. Gravitational Developer Handling Methods and Devices
   a. Incremental (e.g., Bucket Devices)
   b. Continuous (e.g., Wheel)
   c. Magnetic
   d. Non-Linear Developer Flow
2. Impact Developing Methods and Devices
3. Developer Contact and Concentration Control Apparatus
4. Background Suppression Apparatus
5. Flat Plate Development

E. Liquid Development

1. Liquid Aerosol Development
2. Emulsion Development
3. Encapsulated Liquid Development
4. Electrophoretic Development
5. Polar Ink Development

F. Donor Development Methods and Apparatus

G. Dense Bed Development Methods and Apparatus

H. Fluidized Bed Development Methods and Apparatus

I. Toner and Developer Dispensing Methods and Apparatus

1. Developer Dispensing
2. Toner Dispensing
   a. Powdered Toner Containers
   b. Solid Toner Containers
   c. Dispensing Apparatus
      (1) Without Concentration Control
      (2) With Concentration Control

J. Development Electrodes

1. Electrode Types in General
2. Segmented Electrodes
3. Flexible Electrodes
4. Self-Cleaning Electrodes
5. With Variation of Potential

K. Contrast and Large Area Development Enhancement

L. Simultaneous Positive-Negative Formation

M. Reversal Development

N. Developer, Toner and Carrier Compositions

1. Three Component Developer-Carrier, Toner and Additive
   a. Inorganic Additive
   b. Organic Additive
2. Two Component Developer
   a. Distinctive Toner
      (1) Polystyrene-Containing
      (2) Phenol-Formaldehyde Containing
   b. Distinctive Carrier
3. One Component
4. New Carriers
5. New Toners
   a. Distinctive Pigment
   b. Encapsulated Liquids
6. Developer Manufacture
   a. Carrier Preparation
   b. Toner Preparation

O. Miscellaneous

P. Simultaneous Development and Cleaning

6. COPY SUBSTRATE HANDLING SYSTEMS

A. Paper Holding Trays

1. With Stack Height Control

B. Seriatim Stack Feeding Devices

1. Mechanical
2. Aeriform

C. Non-Seriatim Stack Feeding Devices

D. Sheet Tracking, Registration, Aligning, Conveying Devices

1. Belt Conveyors
2. Clutch Mechanisms

E. Sheet Holding Devices (During Image Transfer)

F. Mispuff and Multiple Sheet Detecting Devices

- G. Counter Devices
- H. Sheet Stripping Devices
- I. Sheet Cutting Devices
- J. Sheet Inverting Devices
- K. Copy Distribution, Collection and Sorting Devices

7. DEVELOPED IMAGE TRANSFER AND DISPLAY
   - A. Image Display Systems
     1. Reflective Projection
     2. Transmittive Projection
   - B. Chemical Treatment to Enhance Transfer
   - C. Electrostatic Transfer of Toner
     1. Corona Charging Systems
        a. With Conductive Transfer Web
     2. A.C. Field Transfer
     3. Multiple Transfer
     4. Selective Transfer
   - D. Magnetic Transfer of Toner
   - E. Pressure Transfer of Toner
     1. With Heat
     2. With Solvent
     3. With Tackified Copy Substrate
        a. Gelatin Coated Substrate

8. IMAGE FIXING SYSTEMS
   - A. Heat Fixation
     1. Radiation
        a. Flash Heating
        b. Control Systems
        c. Glass Panel Heating
     2. Conduction
        a. With Pressure Means
     3. Convection
     4. Induction
   - B. Fixation with Vapor Fixative
     1. Fixative Removal
   - C. Fixation with Liquid Fixative
   - D. Fixation with Solid Fixative
   - E. Fixation with Pressure
     1. Gelatin Coated Copy Substrate

9. CLEANING OF IMAGING SURFACE
   - A. Frictional
     1. Web
     2. Brush
        a. With Brush Scraper
        b. With Electrostatic Assist
           (1) Within a Liquid
        c. Filter Bag For Use with
   - B. Non-Frictional
     1. Magnetic Brush
     2. Cleaning Beads
     3. Liquid

10. DOCUMENT HANDLING
    - A. Document Feed Apparatus
    - B. Microfiche Handling Systems
    - C. Stack Feeding Apparatus
    - D. Facsimile Feeding Apparatus
    - E. Document Registration Systems
    - F. Document Inverting Apparatus
    - G. Stacking and/or Imbricating Apparatus
    - H. Collating Apparatus
    - I. Document Jamming Detection Devices

12. PHOTOELECTROPHORESIS
    - A. Basic Process and Materials
    - B. Basic Apparatus
    - C. Machines
    - D. Air Breakdown
    - E. Blocking Electrode
    - F. Camera Apparatus
    - G. Cleaning
    - H. Apparatus Components
    - I. Composite Particle
    - J. Fixing
    - K. Inking
    - L. Masking
    - M. Pigments (Including PEP Use of Particular Pigment)
    - N. Process Variation
    - O. Sensitizors
    - P. Shear
    - Q. Transfer
    - R. Use of Image

15. IMAGING SYSTEMS OTHER THAN ELECTROSTATOGRAPHIC
    - A. Deformation Imaging
    - B. Polymerization Imaging
      1. Photopolymerization Imaging
      2. Charge Injection Polymerization Imaging
    - C. Ferromagnetic Imaging
    - D. Photochromic Imaging
    - E. Vesicular Imaging
    - F. Exposure Only Imaging

17. OPTICAL SYSTEMS
    - A. Radiation Sensing
      1. X-ray, Ultraviolet
      2. Solar Cell
      3. Spectral Response Junctions
      4. Photocell Circuits
    - B. Optical Projection and Modulation
      1. Image Projection
      2. Lenses, Transparencies
      3. Kerr Cell
      4. Modulators
    - C. Image Conversion and Intensification
      1. Emission
      2. Infrared
      3. Passive
      4. Active (Semiconductor)
    - D. Character Generation and Display Devices
      1. Deflection Generated Display
      2. Character Mask
      3. Translation and Function Generation
      4. Justifier
      5. Optical Lens Arrangements
    - E. Optical Imaging and Scanning
      1. Photosensitive Scanners and Spot Scanning Systems
      2. Field Effect Scanners
      3. Lenticular
      4. Scanning Lens Strip and P Mechanisms
      5. Thermotropic, Thermal
      6. Optical Stabilizing F
    - F. Electron Beam De

1. Tubes
2. Circuits

G. Electroluminescent Devices
1. Storage with Field Effect Device
2. Storage Panels—Construction
3. Display, Actuation
4. Enhancement, Amplifications, Conversion

H. Stimulated Emission Devices
1. Laser Structure and Materials
2. Laser Structures
3. Laser Optical Systems and Applications

I. Optical Devices
1. Pressure Gauge
2. Density Measuring
3. Fiber Optics

J. Miscellaneous

18. CHEMICAL COMPOSITIONS AND PREPARATION THEREOF

A. Photosensitive
1. With a Liquid Vehicle
2. Phthalocyanine
a. X-Form
3. Carboxamides
4. Naphthols

B. Polymers

C. Developer, Toner and Carrier Compositions
1. Three Component Developer-Carrier, Toner and Additive
a. Inorganic Additive
b. Organic Additive
2. Two Component Developer
a. Distinctive Toner
(1) Polystyrene-Containing
(2) Phenol-Formaldehyde Containing
b. Distinctive Carrier
3. One Component Developer
4. New Carriers
5. New Toners
a. Distinctive Pigment
b. Encapsulated Liquids
6. Developer Manufacture
a. Carrier Manufacture
b. Toner Preparation

D. Brazing Compositions

20. MECHANICAL COMPONENTS

A. Mechanical Reaction Devices
1. Belts
2. Drives
3. Pulleys and Rollers
4. Load Movers
5. Clutch
6. Transport Motor and Speed Controls

B. Dispensing and Filtering Devices
1. Powder Cloud
2. Particulate Material Dispensing, Distribution
3. Filtering

C. Sensing Devices
1. Powder Level
2. Temperature
3. Quality (Web)
4. Pressure Gauge
5. Wind
6. Weight
7. Thickness

D. Work Devices (Mechanical)
1. Holding, Forming, Feeding
2. Bonding and Fastening
3. Coupling (Pipe)
4. Testing
5. Molding
6. Valves
7. Sizing

E. Antenna Structure

F. Fluid Amplifiers and Magnetically Controllable Switching Devices

G. Miscellaneous

21. METAL WORKING, FORMING AND TREATING

A. Electroforming and Plating
1. Methods
2. Structure
3. Apparatus

B. Metal Treating

24. GRAPHIC ARTS

A. Liquid Ink Recording
1. Electrically Responsive System
2. Electromechanically Responsive System
3. Magnetically Responsive System
4. Photoresponsive System

B. Photographic Copying
1. Transparency Formation
a. Document Support
b. Projection and Exposure
(1) Simultaneous Exposure and Development of Different Frames
(2) Image Reversal Optics
(3) Automatic Masking
c. Transparency Identification
d. Frame Counting and Locating
e. Miscellaneous
2. Contact Printing From a Transparency
a. Transparency Feed
b. Establishing and Maintaining Contact Between Transparency and Copy Material
c. Exposure Control
d. Transfer Imaging
(1) Image Layer Support Strip
3. Processing
a. Material Purification
b. Transparency Transport
4. Viewing

C. Duplicating
1. Method and Apparatus
a. Thermographic
b. Pressure Applied to Sandwich of Original, Transfer and Receiving Sheet
c. Transfer of Electrostatic Charge Through Stencil
d. Condensation Imaging
e. Spirit and Dry Duplicating Systems (Including ELCAR)
(1) Means for Rotably Mounting a Transfer Sheet
(2) Means for Establishing Pressure Between Transfer Sheet and Copy Substrate
(3) Copy Substrate Handling
(4) Program Control
(5) Formation of a Spirit Duplicating Transfer Sheet
(6) Formation of a Stencil Transfer Sheet

(7) Composition of a Transfer Sheet, Receiving Sheets and Printing Inks
D. Planographic Imaging (Including Lithography)
E. Relief Imaging
F. Gravure Printing
G. Miscellaneous

25. ELECTRONIC COMPONENTS
A. Passive Components
1. Printed Circuit Boards
2. Semiconductor Devices
3. Thin Film Components
4. Connectors
B. Active Components
1. Space Charge Devices
2. Junction Devices
3. Thermionic Conversion Devices
4. Thyratrons
C. Circuits
1. Amplifiers
2. Switching
3. Oscillators and Generators
4. Pulse Circuitry, Including Signal Storage and Delay
5. Power Supply
6. Miscellaneous

26. DESIGN PATENTS
A. Reproduction Apparatus
1. In General
2. Document Feeding Apparatus
3. Transfer and Fusing Apparatus
4. Printer
5. Camera
B. Sorting and/or Storing Apparatus
C. Containers for Xerographic Powder
D. Labeling Apparatus
E. Facsimile Transmission Apparatus
1. In General
2. Transceiver Paper Feed Apparatus
3. Adapter for Facsimile Computer System
F. Microform Apparatus
1. Viewer and/or Copier
G. Educational Devices
1. Scales
H. Miscellaneous
1. Housing For Electronic Apparatus
2. Computer Keyboard
3. Send/Receive Data Printer Terminal
4. Telephone Acoustic Coupler
5. Prism
6. Paper Shredder
7. Other

27. PHOTOGRAPHY
A. Direct Printout Members
B. Direct Printout Processes
C. Imaging Member Fabrication
D. Photographic Processes Generally

30. MANIFOLD
A. Basic Process
B. Apparatus
C. Process Variations
D. Activation
E. Image Transfer and Fixing
F. Duplication Masters
G. Image Reversal
H. Reflex Imaging
I. Color Processes

31. MIGRATION IMAGING (XDM)
A. Basic Process
B. Apparatus
C. Process Variation
D. Imaging Members
E. Imaging Member Fabrication
F. Imaged Members
G. Stripping and Splitting
H. Reversal
I. Fixing
J. Duplicating Masters
K. Color
L. Use of Image

32. MISCELLANEOUS
A. Energy Cells
B. Miscellaneous

FOREIGN COUNTRY KEY LETTER CODE

COUNTRY KEY	COUNTRY NAME
AAA	NO FOREIGN FILING
ALB	ALBANIA
ALG	ALGERIA
ARG	ARGENTINA
ATR	AUSTRIA
AUS	AUSTRALIA
BAH	BAHAMAS
BAR	BAHRAIN
BEL	BELGIUM
BOL	BOLIVIA
BRA	BRAZIL
BRS	BR. SOLOMON ISL.
BRU	BRUNEI
BUL	BULGARIA
BUR	BURUNDI
CAM	CAMBODIA
CAN	CANADA
CEY	CEYLON
CHL	CHILE
CHN	CHINA
CLB	COLOMBIA
COR	CONGO REP. (ZAIRE)
COS	COSTA RICA
CUB	CUBA
CZC	CZECHOSLOVAKIA
DNK	DENMARK
DOR	DOMINICAN REP.
ECD	ECUADOR
EGP	EGYPT
EGR	E. GERMANY
EIR	EIRE
ELS	EL SALVADOR
FIJ	FIJI
FIN	FINLAND
FOM	FORMOSA
FRA	FRANCE
GER	GERMANY
GHA	GHANA
GIB	GIBRALTAR
GIE	GIBERT & ELLICE
GNR	GUINEA REP.
GRB	GR. BRITAIN
GRK	GREECE
GUA	GUATEMELA
GUR	GUERNSEY
HGK	HONG KONG
HOL	HOLLAND
HON	HONDURAS
HUN	HUNGARY
ICE	ICELAND
IDS	INDONESIA
IND	INDIA
IRL	IRELAND
IRN	IRAN
ISR	ISRAEL
ITL	ITALY
JAM	JAMAICA
JAP	JAPAN

COUNTRY KEY	COUNTRY NAME
JER	JERSEY
KEN	KENYA
KOR	KOREA
KUW	KUWAIT
LAS	LAOS
LEB	LEBANON
LIB	LIBERIA
LXB	LUXEMBOURG
MAU	MAURITIUS
MEX	MEXICO
MLI	MALI
MLS	MALASIA
MLT	MALTA
MLW	MALAWI
MNC	MONACO
MRC	MOROCCO
NIG	NIGERIA
NOR	NORWAY
NZL	NEW ZEALAND
PAK	PAKISTAN
PLD	POLAND
PLP	PHILIPPINES
PNM	PANAMA
PRU	PERU
PTG	PORTUGAL
RHD	RHODESIA
RMN	RUMANIA
RWD	RWANDA
SAB	SAUDI ARABIA
SAF	SOUTH AFRICA
SBH	SABAH
SGP	SINGAPORE
SHL	ST. HELENA
SLN	SIERRA LEONE
SPN	SPAIN
SRK	SARAWAK
STZ	SWITZERLAND
SWA	SO. WEST AFRICA
SWD	SWEDEN
SYA	SYRIA
TGR	TANGIER
THL	THAILAND
TIW	TAIWAN
TNS	TUNIS
TRD	TRINIDAD
TRK	TURKEY
TZN	TANZANIA
UGD	UGANDA
UK	UNITED KINGDOM (Fuji Xerox list only)
URG	URUGUAY
USA	USA
USR	USSR
UAR	UNITED ARAB REP.
VTM	VIETNAM
VZL	VENEZUELA
YGS	YUGOSLAVIA
ZMB	ZAMBIA
ZZZ	

FUJI XEROX PATENTS

Class 1A1C

3,569,803.—ELECTROPHOTOGRAPHIC PROCESS UTILIZING FRICTION CHARGING. MAR. 9, 1971. BEL. 719365, CAN. 925561, FRA. 1577647, U.K. 1232470.

3,573,905.—METHOD OF PRODUCING ELECTROPHOTOSENSITIVE CADMIUM SULFIDE WITH CRYSTALS OF A HEXAGONALITY OF LESS THAN 80%. APR. 6, 1971. BEL. 682886, CAN. 814845, FRA. 1526846, JAP. 43-16195, MEX. 93082, U.K. 1148487.

3,775,103.—ELECTROPHOTOGRAPHIC MATERIAL AND PROCESS FOR PRODUCING SAME. NOV. 27, 1973. BEL. 693919, FRA. 1511300, GER. 1,522,612, ITL. 798303, NOR. 122730, U.K. 1,183,762.

3,775,106.—ELECTROPHOTOGRAPHIC PROCESS. NOV. 27, 1973. BEL. 771855, CAN. 946465, JAP. 49-17531, U.K. 1328318.

Class 1A1F

3,705,032.—ELECTROPHOTOGRAPHIC MATERIALS. DEC. 5, 1972. AUS. 432027, BEL. 737701, CAN. 918984, FRA. 6928605, GER. 1942383, ITL. 872749, JAP. 48-2966, U.K. 1237036.

Class 1A2C

3,660,086.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS EMPLOYING INORGANIC PHOTOCONDUCTIVE MATERIAL WITH A PHOTOCHROMIC SENSITIZING AGENT. MAY 2, 1972. U.K. 1290441.

3,799,773.—ELECTROPHOTOGRAPHIC PROCESS EMPLOYING A PHOTOCHROMIC COMPOUND AND TRANSPARENT TONER. MAR. 26, 1974.

Class 1A6

3,787,235.—METHOD OF ELECTROPHOTOGRAPHIC SENSITIVE PAPER. JAN. 22, 1974. JAP. 48-1330.

Class 1C4B

3,563,733.—METHODS OF PREPARING RELIEF IMAGES BY ENZYMATIC DIGESTION. FEB. 16, 1971. BEL. 709856, CAN. 830395, FRA. 1564578, JAP. 46-11628, U.K. 1217087.

3,630,728.—ELECTROPHOTOGRAPHIC METHOD OF FORMING RELIEF IMAGES. DEC. 28, 1971. BEL. 728693, CAN. 877883, FRA. 2002.362, JAP. 46-41348, U.K, 1228509.

Class 1E

3,549,359.—COLOR ELECTROPHOTOGRAPHY EMPLOYING DYE TRANSFER FROM A DYE-CONTAINING PHOTOSENSITIVE LAYER TO AN IMAGE RECEIVING SHEET. DEC. 22, 1970. FRA. 1524473, GER. 1,572,341, JAP. 45-40159, U.K. 1,183,532.

3,615,391.—ELECTROPHOTOGRAPHIC COLOR DEVELOPING METHOD. OCT. 26, 1971. AUS. 435735, CAN. 842157, FRA. 1572518, JAP. 46-21996, U.K. 1231846, U.K. 1257609.

Class 1E

3,615,392.—ELECTROPHOTOGRAPHIC REPRODUCTION OF ORIGINALS CONTAINING BOTH MULTICOLOR AND LINE AREAS. OCT. 26, 1971. CAN. 902986, JAP. 46-43951.

3,654,865.—METHOD FOR FORMING DYE IMAGE USING AN ELECTROPHOTOGRAPHIC DEVELOPER CONTAINING A GELATIN TONER. APR. 11, 1972. AUS. 435812, BEL. 745534, CAN. 924.951, FRA. 7004034, ITL. 888.447, JAP. 48-9017, U.K. 1257296.

3,656,947.—CODING OF ORIGINALS AND SENSITIVE PAPER IN A MULTI-COLOR ELECTROPHOTOGRAPHIC PROCESS. APR. 18, 1972. BEL. 748591, CAN. 902987, FRA. 7012518, JAP. 48-26778, U.K. 1309644.

3,672,887.—ELECTROPHOTOGRAPHIC PROCESS FOR MULTICOLOR REPRODUCTION. JUNE 27, 1972. JAP. 47-19395.

3,687,661.—COLOR ELECTROPHOTOGRAPHIC PROCESS. AUG. 29, 1972. CAN. 925929, JAP. 48-28697.

3,689,260.—COLOR ELECTROPHOTOGRAPHIC PROCESS WITH RESIN DEPOSITION FOR STABILIZATION OF TONER IMAGE. SEPT. 5, 1972. AUS. 437666, BEL. 7531555, CAN. 927649, FRA. 7025295, ITL. 910210, JAP. 48-26779, U.K. 1279506.

Class 1E

3,705,767.—ELECTROPHOTOGRAPHIC DEVICE. DEC. 12, 1972. BEL. 753687, CAN. 947357, FRA. 7026800, GER. 2036140, ITL. 902477, JAP. 48-11054, U.K. 1266112.

3,779,639.—COLOR ELECTROPHOTOGRAPHIC APPARATUS. DEC. 18, 1973. U.K. 1331870.

3,785,812.—METHOD OF EXPOSURE IN MULTI-COLOR ELECTROPHOTOGRAPHY. JAN. 15, 1974. ARG. 185812, AUS. 417288, BEL. 759392, CAN. 945619, FRA. 7042329, ITL. 914549, JAP. 49-23905, U.K. 1322847.

3,806,340.—COLOR ELECTROPHOTOGRAPHIC PROCESS EMPLOYING A POLAR ORGANIC SOLVENT VAPOR. APR. 23, 1974. BEL. 774765, CAN. 946671, FRA. 7138742, JAP. 49-23905, U.K. 1322847.

Class 1F

3,473,923.—REPRODUCTION PROCESS INCLUDING TRANSFER AND REDEVELOPMENT OF ELECTROSTATICALLY FORMED IMAGES. OCT. 21, 1969. BEL. 679506, FRA. 1479592, GER. 1,522,597. JAP. 43-07586, U.K. 1152832.

Class 1F

3,745,002.—METHOD OF PREPARING A PRINTING MASTER BY XEROGRAPHY. JULY 10, 1973. ARG. 120543, AUS. 432568, BEL. 756.595, CAN. 903014, FRA. 2068748, JAP. 48-27362, MEX. 119463, U.K. 1314109.

3,788,845.—PROCESS FOR FORMING DYE IMAGES. JAN. 29, 1974.

Class 1G

3,764,309.—COLOR PRINTING METHOD. OCT. 9, 1973. BEL. 724581, CAN. 877884, FRA. 1595848, ITL. 848192, JAP. 46-33541, U.K. 1223020.

Class 1I

3,762,811.—METHOD AND APPARATUS FOR ELECTROPHOTOGRAPHY. OCT. 2, 1973.

3,784,301.—ELECTROPHOTOGRAPHIC BORDER APPARATUS. JAN. 8, 1974. JAP. 49-26590.

Class 1J6

3,796,187.—APPARATUS FOR DEVELOPING CONTINUOUS ELECTROPHOTOGRAPHIC PHOTOSENSITIVE WEB MATERIAL. MAR. 12, 1974. BEL. 769412, CAN. 934541, FRA. 7123852, ITL. 934462, U.K. 1332534.

Class 1K

3,408,217.—FINGERPRINT RECORDING. OCT. 29, 1968. JAP. 41-21520, U.K. 1095572.

Class 1K

3,492,140.—METHOD OF RECORDING FINGERPRINTS OF HUMAN BODY. JAN. 7, 1970. FRA. 1386116, JAP. 39-27575, U.K. 1063635.

Class 1K3

3,745,002.—METHOD OF PREPARING A PRINTING MASTER BY XEROGRAPHY. JULY 10, 1973. ARG. 120543, AUS. 432568, BEL. 756.595, CAN. 903014, FRA. 2068748, JAP. 48-27362, MEX. 119463, U.K. 1314109.

Class 2A1E

3,506,595.—PHOTOCONDUCTIVE INSULATING MATERIALS. APR. 14, 1970. FRA. 1498064, GER. 1,522,606, JAP. 43-24394, U.K. 1148537.

3,615,401.—PROCESS FOR THE PREPARATION OF PHOTOCONDUCTIVE LIGHT-SENSITIVE MATERIALS COMPRISING CdS OR CdS.N $CdCo_2$. OCT. 26, 1971. FRA. 2001257, JAP. 47-40819, U.K. 1239129.

3,615,410.—ELECTROPHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL CONTAINING A PROTEASE ENZYME. OCT. 26, 1971. BEL. 730415, CAN. 885386, FRA. 2004.940, U.K. 1224711.

Class 2A1E1

3,385,699.—PROCESS FOR PROCESSING ELECTROPHOTOSENSITIVE LAYERS. MAY 28, 1968. BEL. 651039, FRA. 1402385, HOL. 130806, SWD. 310458, U.K. 1072476.

3,494,766.—LIGHT SENSITIVE LAYER FOR ELECTROPHOTOGRAPHY. FEB. 10. 1970. CAN. 791648, FRA. 1460449, NOR. 112288, SWD. 226000, U.K. 1085939.

3,494,789.—PHOTOCONDUCTIVE INSULATING MATERIAL. FEB. 10, 1970. CAN. 813830, FRA. 1564467, ITL. 788829, JAP. 44-10631, MEX. 88112, U.K. 1120091.

3,615,410.—ELECTROPHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL CONTAINING A PROTEASE ENZYME. OCT. 26, 1971. BEL. 730415, CAN. 885386, FRA. 2004.940, U.K. 1224711.

3,634,333.—PROCESS FOR COATING ZINC OXIDE POWDER WITH CADMIUM SULFIDE. JAN. 11, 1972. BEL. 731056, CAN. 882.627, FRA. 2.005.849, GER. 1916761, JAP. 47-49616, U.K. 1215685.

Class 2A1E1

3,660,086.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS EMPLOYING INORGANIC PHOTOCONDUCTIVE MATERIAL WITH A PHOTOCHROMIC SENSITIZING AGENT. MAY 2, 1972. U.K. 1290441.

3,674,476.—PROCESS FOR PRODUCING PHOTOCONDUCTIVE LAYER FOR ELECTROPHOTOGRAPHY. JULY 4, 1972. BEL. 751.676, CAN. 918481, FRA. 2051030, U.K. 1264719.

3,689,260.—COLOR ELECTROPHOTOGRAPHIC PROCESS WITH RESIN DEPOSITION FOR STABILIZATION OF TONER IMAGE. SEPT. 5, 1972. AUS. 437666, BEL. 753155, CAN. 927649, FRA. 7025295, ITL. 910210, JAP. 48-26779, U.K. 1279506.

3,707,392.—METHOD OF SENSITIZATION OF AN ELECTROPHOTOGRAPHIC MATERIAL. DEC. 26, 1972. AUS. 444836, BEL. 744600, CAN. 888125, FRA. 7001955, GER. 2002607, ITL. 892368, JAP. 48-7814, U.K. 1257154.

3,725,060.—HEMATEIN OR HEMATOXYLIN-CONTAINING ZINC OXIDE PHOTOCONDUCTIVE LAYERS. APR. 3, 1973. JAP. 49-4340.

3,761,261.—PHTHALOCYANINE DYE SENSITIZERS FOR ZINC OXIDE. SEPT. 25, 1973. JAP. 45-990335.

Class 2A1F

3,394,001.—ELECTROPHOTOGRAPHIC SENSITIVE CONTAINING ELECTRON DONOR DYE LAYERS. JULY 23, 1968. JAP. 44-15758, U.K. 1,106,562.

3,476,659.—ELECTROPHOTOGRAPHIC IMAGING AND COPYING PROCESS. NOV. 4, 1969. BEL. 684406, FRA. 1489929, ITL. 773333, JAP. 43-27579, U.K. 1159394.

3,654,865.—METHOD FOR FORMING DYE IMAGE USING AN ELECTROPHOTOGRAPHIC DEVELOPER CONTAINING A GELATIN TONER. APR. 11, 1972. AUS. 435812, BEL. 745534, CAN. 924.951, FRA. 7004034, ITL. 888.447, JAP. 48-9017, U.K. 1257296.

3,704,123.—DYE SENSITIZED PHOTOCONDUCTIVE MATERIAL. NOV. 28, 1972. AUS. 424510, BEL. 720260, CZC. 142206, FRA. 1568416, GER. 1772210, ITL. 831114, JAP. 47-20753, U.K. 1190676, USR. 374866.

3,705,032.—ELECTROPHOTOGRAPHIC MATERIALS. DEC. 5, 1972. AUS. 432027, BEL. 737701, CAN. 918984, FRA. 6928605, GER. 1942383, ITL. 872749, JAP. 48-2966, U.K. 1237036.

Class 2A1F

3,707,392.—METHOD OF SENSITIZATION OF AN ELECTROPHOTOGRAPHIC MATERIAL. DEC. 26, 1972. AUS. 444836, BEL. 744600, CAN. 888125, FRA. 7001955, GER. 2002607, ITL. 892368, JAP. 48-7814, U.K. 1257154.

Class 2A1G

3,541,028.—PHOTOCONDUCTIVE INSULATING MATERIALS. NOV. 17, 1970. FRA. 1494699, GER. 1,522,605, JAP. 43-14494, U.K. 1128417.

Class 2A2

3,647,428.—PHOTOCONDUCTIVE MATERIAL FOR ELECTROPHOTOGRAPHY. MAR. 7, 1972. AUS. 429949, BEL. 759550, CAN. 924162, FRA. 2072521, ITL. 923181, JAP. 48-4316, U.K. 1269429.

3,704,119.—ELECTROPHOTOGRAPHIC PROCESS USING TONER OF SAME REFRACTIVE INDEX AS ORGANIC PHOTOCONDUCTIVE LAYER. NOV. 28, 1972. AUS. 433360, BEL. 754544, FRA. 7028556, ITL. 902771, JAP. 48-21054, U.K. 1321065.

Class 2A2A

3,707,369.—PHOTOCONDUCTIVE ELEMENTS CONTAINING 2-METHYL-3, 3-DIMETHYL INDOLE DERIVATIVES. DEC. 26, 1972. BEL. 754969, CAN. 898823, FRA. 703049, GER. 2041490, U.K. 1268889.

Class 2B

3,394,001.—ELECTROPHOTOGRAPHIC SENSITIVE MATERIAL CONTAINING ELECTRON-DONOR DYE LAYERS. JULY 23, 1968. JAP. 44-15758, U.K. 1,106,562.

3,656,949.—METHOD OF PRODUCING AN ELECTROPHOTOGRAPHIC AND ELECTROGRAPHIC RECORDING MEMBER. APR. 18, 1972. BEL. 734288, CAN. 890875, FRA. 6919148, GER. 1929162, JAP. 48-787, U.K. 1259158.

3,704,121.—ELECTROPHOTOGRAPHIC REPRODUCTION PROCESS USING A DUAL LAYERED PHOTORECEPTOR. NOV. 28, 1972. BEL. 739153, FRA. 6932116, ITL. 890989, JAP. 49-25218, SPN. 371685, STZ. 519188, U.K. 1272131.

Class 2B1

3,574,682.—ELECTROSTATIC RECORDING MATERIALS. APR. 13, 1971. U.K. 1213395.

3,787,235.—METHOD OF ELECTROPHOTOGRAPHIC SENSITIVE PAPER. JAN. 22, 1974. JAP. 48-1330.

Class 2B2

3,552,956.—METHOD FOR TREATING ELECTROPHOTOGRAPHIC RECORDING MATERIALS WITH PROTECTIVE OVERCOATINGS. JAN. 5, 1971. BEL. 693184, FRA. 1508918, SWD. 326372, U.K. 1155665.

3,717,461.—REMOVAL OF PROTECTIVE RESIN LAYER BY LIQUID DEVELOPER IN ELECTROPHOTOGRAPHIC IMAGING. FEB. 20, 1973. ARG. 182091, AUS. 428797, BEL. 762.808, CAN. 929016, FRA. 2078511, ITL. 919801, MEX. 120941, U.K. 1326300.

Class 2B4

3,428,453.—IMAGING FORMING PROCESS UTILIZING XEROGRAPHY. FEB. 18, 1969. FRA. 1,428,775, ITL. 754,825, JAP. 43-02622, U.K. 1,085,151.

Class 2E

3,417,733.—APPARATUS FOR VACUUM COATING. DEC. 24, 1968. FRA. 1,415,251, GER. 1,521,238, JAP. 40-26402, U.K. 1,081,324.

3,573,905.—METHOD OF PRODUCING ELECTROPHOTOSENSITIVE CADMIUM SULFIDE WITH CRYSTALS OF A HEXAGONALITY OF LESS THAN 80% APR. 6, 1971. BEL. 682886, CAN. 814845, FRA. 1526846, JAP. 43-16195, MEX. 93082, U.K. 1148487.

Class 2E

3,656,949.—METHOD OF PRODUCING AN ELECTROPHOTOGRAPHIC AND ELECTROGRAPHIC RECORDING MEMBER. APR. 18, 1972. BEL. 734288, CAN. 890875, FRA. 6919148, GER. 1929162, JAP. 48-787, U.K. 1259158.

3,672,988.—METHOD OF MANUFACTURING BASES FOR ELECTROSTATIC RECORDING MATERIAL OR ELECTROPHOTOGRAPHIC MATERIAL. JUNE 27, 1972. AUS. 437336, BEL. 746420, CAN. 898621, GER. 2008636, ITL. 888758, JAP. 47-45549, U.K. 1301926.

3,674,476.—PROCESS FOR PRODUCING PHOTOCONDUCTIVE LAYER FOR ELECTROPHOTOGRAPHY. JULY 4, 1972. BEL. 751.676, CAN. 918481, FRA. 2051030, U.K. 1264719.

3,772,173.—ELECTROCONDUCTIVE PAPER. NOV. 13, 1973. CAN. 930693, JAP. 48-15037, U.K. 1329569.

3,775,103.—ELECTROPHOTOGRAPHIC MATERIAL AND PROCESS FOR PRODUCING SAME. NOV. 27, 1973. BEL. 693919, FRA. 1511300, GER. 1522612, ITL. 798303, NOR. 122730, U.K. 1183762.

3,927,638.—VACUUM EVAPORATION PLATING APPARATUS. DEC. 23, 1975.

Class 3

3,764,207.—ELECTROPHOTOGRAPHIC PROCESS UTILIZING SINGLE CHARGING MEANS FOR EFFECTING SIMULTANEOUS FUNCTIONS OF CHARGING AND FACILITATING TONER IMAGE TRANSFER. OCT. 9, 1973.

Class 3C

3,612,864.—IMAGING SYSTEM UTILIZING AN ELECTRODE TREATED WITH A MIXTURE OF A HYGROSCOPIC MATERIAL AND A HYDROPHILIC BINDER. OCT. 12, 1971. BEL. 726690, CAN. 885615, JAP. 47-12440.

3,775,106.—ELECTROPHOTOGRAPHIC PROCESS. NOV. 27, 1973. BEL. 771855, CAN. 946465, JAP. 49-17531, U.K. 1328318.

Class 3C1

3,772,173.—ELECTROCONDUCTIVE PAPER. NOV. 13, 1973. CAN. 930693, JAP. 48-15037, U.K. 1329569.

Class 3C3

3,649,830.—UNIFORM CHARGING METHOD AND APPARATUS USING AN ARRAY OF NEEDLE ELECTRODES. MAR. 14, 1972. CAN. 940590, JAP. 48-28301, U.K. 1279758.

3,655,966.—ELECTRIC CHARGING DEVICE FOR ELECTROPHOTOGRAPHY. APR. 11, 1972. CAN. 922359, JAP. 48-25942, U.K. 1323599.

Class 3C4

3,719,481.—ELECTROSTATOGRAPHIC IMAGING PROCESS. MAR. 6, 1973. CAN. 948693, FRA. 7108391, ITL. 921208, U.K. 1281149.

Class 3C5

3,715,640.—CORONA CHARGING PROCESS AND APPARATUS IN ELECTROPHOTOGRAPHY. FEB. 6, 1973. AUS. 425637, BEL. 765716, CAN. 927473, FRA. 71131128, ITL. 923947, JAP. 49-17379, U.K. 1338691.

3,779,749.—METHOD OF CHARGING IN ELECTROPHOTOGRAPHY. DEC. 18, 1973. BEL. 772412, CAN. 9481495, FRA. 7132246, ITL. 942080, JAP. 49-17532, U.K. 1359182.

3,788,844.—CHARGING METHOD FOR ELECTROPHOTOGRAPHY. JAN. 29, 1974. JAP. 49-13025, U.K. 1344908.

3,789,222.—CORONA CHARGE METHOD. JAN. 29, 1974. BEL. 771311, CAN. 943180, FRA. 7129655, ITL. 933902, JAP. 49-17530.

3,789,224.—PROCESS FOR CHARGING ELECTROPHOTOGRAPHIC MATERIALS. JAN. 29, 1974. AUS. 435928, BEL. 772465, CAN. 945834, FRA. 7132445, ITL. 938023, JAP. 49-23902, U.K. 1359181.

Class 3C9

3,582,731.—CHARGING SYSTEM. JUNE 1, 1971. CAN. 906045, JAP. 46-30636.

Class 3d

3,546,545.—METHOD OF CHARGING A PHOTOCONDUCTIVE INSULATING LAYER. DEC. 8, 1970. BEL. 721040, FRA. 1586221, U.K. 1205297.

3,569,803.—ELECTROPHOTOGRAPHIC PROCESS UTILIZING FRICTION CHARGING. MAR. 9, 1971. BEL. 719365, CAN. 925561, FRA. 1577647, U.K. 1232470.

Class 3E

3,704,121.—ELECTROPHOTOGRAPHIC REPRODUCTION PROCESS USING A DUAL LAYERED PHOTORECEPTOR. NOV. 28, 1972. BEL. 739153, FRA. 6932116, ITL. 890989, JAP. 49-25218, SPAN. 371685, STZ. 519188, U.K. 1272131.

3,715,640.—CORONA CHARGING PROCESS AND APPARATUS IN ELECTROPHOTOGRAPHY. FEB. 6, 1973. AUS. 425637, BEL. 765716, CAN. 927473, FRA. 71131128, ITL. 923947, JAP. 49-17379, U.K. 1338691.

Class 3F

3,749,927.—ELECTROSTATIC CHARGING PROCESS FOR ELECTROPHOTOSENSITIVE MATERIAL. JULY 31, 1973. AUS. 435008, BEL. 469413, FRA. 7123717, ITL. 934461, JAP. 49-16060, U.K. 1316047.

3,778,148.—APPARATUS AND METHOD FOR SELECTIVELY DISCHARGING THE PHOTOCONDUCTIVE SURFACE OF AN ELECTROSTATIC DRUM COPIER TO FACILITATE THE CLEANING THEREOF. DEC. 11, 1973.

3,778,623.—CHARGING METHOD OF ELECTROPHOTOGRAPHIC MATERIALS. DEC. 11, 1973. FRA. 7229549.

3,789,223.—CHARGING METHOD FOR RELATIVELY MOVABLE ELECTROPHOTOGRAPHIC MEANS AND CORONA MEANS. JAN. 29, 1974. AUS. 431512, BEL. 771143, FRA. 7129349, ITL. 935108, JAP. 49-17529, U.K. 1347100.

3,789,224.—PROCESS FOR CHARGING ELECTROPHOTOGRAPHIC MATERIALS. JAN. 29, 1974. AUS. 435928, BEL. 772465, CAN. 945834, FRA. 7132445, ITL. 938023, JAP. 49-23902, U.K. 1359181.

Class 4A

3,741,644.—ORIGINAL POSITION CONFIRMING MEANS FOR DUPLICATING APPARATUS. JUNE 26, 1973.

Class 4A1

3,771,082.—COPYING APPARATUS WITH AUXILIARY LIGHT SOURCE FOR ILLUMINATING AN ORIGINAL TO BE REPRODUCED. NOV. 6, 1973. U.K. 1350616.

Class 4A1

3,841,752.—LIGHT SOURCE FOR COPYING MACHINE. OCT. 15, 1974.

Class 4A2

3,737,223.—PLATEN DRIVING DEVICE IN AN ELECTROPHOTOGRAPHIC COPYING MACHINE. JUNE 5, 1973. U.K. 1341619.

Class 4B

3,687,661.—COLOR ELECTROPHOTOGRAPHIC PROCESS. AUG. 29, 1972. ARG. 182081, BEL. 759454, CAN. 932785, FRA. 7043828, ITL. 909538, JAP. 49-18265, U.K. 1327486.

3,784,301.—ELECTROPHOTOGRAPHIC BORDER APPARATUS. JAN. 8, 1974. JAP. 49-26590.

3,785,812.—METHOD OF EXPOSURE IN MULTI-COLOR ELECTROPHOTOGRAPHY. JAN. 15, 1974. ARG. 185812, AUS. 417288, BEL. 759392, CAN. 945619, FRA. 7042329, ITL. 914549, JAP. 49-11573, U.K. 1326580.

Class 4B1

3,927,940.—MANUSCRIPT SCANNING DEVICE FOR COPYING MACHINES AND THE LIKE. DEC. 23, 1975.

3,955,048.—SCANNING METHOD AND APPARATUS. MAY 4, 1976.

Class 4B1A

3,778,153.—OPTICAL IMAGING SYSTEM. DEC. 11, 1973.

Class 4B7

3,313,883.—SYSTEMS FOR RECORDING CHARACTERS ON LIGHT SENSITIVE RECORDING SURFACES. AUG. 25, 1964. CAN. 693,055, FRA. 1,246,197, GER. 1,449,634, JAP. 318,009.

Class 4B7

3,615,391.—ELECTROPHOTOGRAPHIC COLOR DEVELOPING METHOD. OCT. 26, 1971. AUS. 435735, CAN. 842157, FRA. 1572518, JAP. 46-21996, U.K. 1231846, U.K. 1257609.

3,656,947.—CODING OF ORIGINALS AND SENSITIVE PAPER IN A MULTI-COLOR ELECTROPHOTOGRAPHIC PROCESS. APR. 18, 1972. BEL. 748591, CAN. 902987, FRA. 7012518, JAP. 48-26778, U.K. 1309644.

Class 5A1A

3,451,376.—DEVELOPING DEVICE FOR ELECTROPHOTOGRAPHY. JUNE 24, 1969. AUS. 410555, FRA. 1556520, SWD. 319382, U.K. 1173377.

Class 5A2

3,418,972.—POWDER DUSTING DEVICE FOR ELECTROPHOTOGRAPHY. DEC. 31, 1968. FRA. 1544620, JAP. 45-8838, U.K. 1169410.

Class 5A3B

3,418,972.—POWDER DUSTING DEVICE FOR ELECTROPHOTOGRAPHY. DEC. 31, 1968. FRA. 1544620, JAP. 45-8838, U.K. 1169410.

Class 5A4

3,681,065.—DYE TRANSFER COLOR ELECTROPHOTOGRAPHY. AUG. 1, 1972. CAN. 884,227, JAP. 44-32208.

Class 5A5

3,620,800.—CLEANING LIQUID DEVELOPED ELECTROSTATIC IMAGES BY CONTACT WITH VAPORIZED CLEANING FLUID. NOV. 16, 1971. CAN. 915753, CAN. 933997, JAP. 48-13454.

Class 5C

3,927,641.—DEVELOPING MECHANISM USING MAGNETIC BRUSH. DEC. 23, 1975.

3,937,181.—MAGNETIC BRUSH TYPE DEVELOPING MECHANISM IN ELECTROPHOTOGRAPHIC COPYING MACHINE. FEB. 10, 1976.

Class 5C1

3,545,968.—DEVELOPING A LATENT ELECTROSTATIC IMAGE WITH FERROMAGNETIC CARRIER AND TONER BY EMPLOYING A VARYING MAGNETIC FIELD. DEC. 8, 1970. BEL. 710692, FRA. 1561470, U.K. 1205175.

3,908,595.—MAGNETIC BRUSH DEVELOPMENT APPARATUS UTILIZING MAGNETIC MEANS. SEPT. 30, 1975.

Class 5C2

3,672,887.—ELECTROPHOTOGRAPHIC PROCESS FOR MULTICOLOR REPRODUCTION. JUNE 27, 1972. JAP. 47-19395.

3,764,309.—COLOR PRINTING METHOD. OCT. 9, 1973. BEL. 724581, CAN. 877884, FRA. 1595848, ITL. 848192, JAP. 46-33541, U.K. 1223020.

Class 5D1

3,783,818.—ELECTROPHOTOGRAPHIC DEVELOPING PROCESS. JAN. 8, 1974. BEL. 781515, FRA. 7211409, ITL. 950927, U.K. 1358450.

Class 5D2

3,336,904.—XEROGRAPHIC DEVELOPING APPARATUS. AUG. 22, 1967. BEL. 651786, GER. 1,472,946, HOL. 132649, JAP. 40-23755, U.K. 1068575.

Class 5D3

3,804,659.—ELECTROPHOTOGRAPHIC REVERSAL DEVELOPMENT PROCESS FOR ENHANCING THE QUALITY OF THE DEVELOPED IMAGE. APR. 16, 1974. FRA. 7144069, JAP. 49-26901.

Class 5E

3,540,885.—REDUCTION OF FOG FORMATION IN AN ELECTROPHOTOGRAPHIC LIGHT SENSITIVE SHEET. NOV. 17, 1970. BEL. 693302, FRA. 1509571, JAP. 44-2551, U.K. 1176001.

3,560,203.—ELECTROPHOTOGRAPHIC DEVELOPING PROCESS. FEB. 2, 1971. FRA. 1604137, U.K. 1165038.

3,566,834.—ELECTROPHOTOGRAPHIC DEVELOPING DEVICE. MAR. 2, 1971. AUS. 417201, BEL. 718329, FRA. 1578391, JAP. 48-31853, U.K. 1194789.

3,622,515.—ELECTROPHOTOGRAPHIC LIQUID DEVELOPER HAVING A PROTEOLYTIC ENZYME. NOV. 23, 1971. AUS. 436813, BEL. 732273, CAN. 896948, FRA. 2007.520, ITL. 867188, JAP. 47-17879, U.K. 1231544.

3,627,557.—LIQUID DEVELOPMENT BY REDUCING THE VISCOSITY OF THE DEVELOPER ON A ROLLER APPLICATION PRIOR TO DEVELOPMENT. DEC. 14, 1971. CAN. 905230, U.K. 1303499.

Class 5E

3,628,981.—LIQUID TONER DEVELOPMENT. DEC. 21, 1971. BEL. 751669, CAN. 902982, FRA. 7021033, ITL. 893939, JAP. 48-18859, U.K. 1284477.

3,642,515.—LIQUID DEVELOPMENT UTILIZING A CURVILINEAR DEVELOPMENT ELECTRODE. FEB. 15, 1972. CAN. 867698.

3,668,126.—METHOD OF PRODUCING ELECTROPHOTOGRAPHIC LIQUID DEVELOPERS HAVING VERY FINE COLORING MATERIAL. JUNE 6, 1972. BEL. 709625, FRA. 1562934, U.K. 1218064.

3,671,290.—IMAGING SYSTEM. JUNE 20, 1972. CAN. 917486, JAP. 48-8134, U.K. 1278858.

3,685,907.—ELECTROPHOTOGRAPHIC PROCESS. AUG. 22, 1972. ARG. 181932, AUS. 442703, BEL. 752387, CAN. 910132, FRA. 2-51297, ITL. 902170, MEX. 116451, U.K. 1292200.

Class 5E

3,692,523.—PROCESS FOR DEVELOPING ELECTROSTATIC LATENT IMAGE AND LIQUID DEVELOPER USED THEREFOR. SEPT. 19, 1972. AUS. 437065, BEL. 745533, CAN. 924.167, FRA. 7040233, GER. 20052680, ITL. 888.449, JAP. 48-7821, U.K. 1255445.

3,703,400.—DEVELOPING METHOD FOR ELECTROPHOTOGRAPHY. NOV. 21, 1972. AUS. 435816, BEL. 748.590, CAN. 898073, FRA. 7012445, GER. 2016586, ITL. 903950, U.K. 1251623.

3,705,032.—ELECTROPHOTOGRAPHIC MATERIALS. DEC. 5, 1972. AUS. 432027, BEL. 737701, CAN. 918984, FRA. 6928605, GER. 1942383, ITL. 872749, JAP. 48-2966, U.K. 1237036.

3,705,767.—ELECTROPHOTOGRAPHIC DEVICE. DEC. 12, 1972. BEL. 753687, CAN. 947357, FRA. 7026800, GER. 2036140, ITL. 902477, JAP. 48-11054, U.K. 1266112.

Class 5E

3,707,139.—LIQUID TYPE ELECTROPHOTOGRAPHY DEVELOPING APPARATUS. DEC. 26, 1972. BEL. 756409, CAN. 918413, FRA. 7034577, GER. 1314865.

3,713,422.—APPARATUS FOR DEVELOPING AN ELECTROSTATIC LATENT IMAGE BY LIQUID DEVELOPMENT. JAN. 30, 1973. BEL. 764267, CAN. 932954, FRA. 7109086, GER. 763,992, U.K. 1341631.

3,716,360.—MOLTEN IMAGE TRANSFER IN ELECTROPHOTOGRAPHY. FEB. 13, 1973. BEL. 763191, FRA. 7105717, GER. 2108080, ITL. 919905, U.K. 1313059.

3,717,461.—REMOVAL OF PROTECTIVE RESIN LAYER BY LIQUID DEVELOPER IN ELECTROPHOTOGRAPHIC IMAGING. FEB. 20, 1973. ARG. 182091, AUS. 428797, BEL. 762808, CAN. 929016, FRA. 2078511, ITL. 919801, MEX. 120941, U.K. 1326300.

3,718,593.—PROCESS FOR THE PRODUCTION OF AN ELECTROPHOTOGRAPHIC LIQUID DEVELOPER CONTAINING GELATIN. FEB. 27, 1973. AUS. 438586, BEL. 745535, CAN. 924166, FRA. 7004034, ITL. 888743, JAP. 48-7822, U.K. 1255763.

Class 5E

3,738,832.—COLOR ELECTROPHOTOGRAPHIC PROCESS EMPLOYING LIQUID DEVELOPER CONTAINING GELATIN. JUNE 12, 1973. CAN. 921746, JAP. 47-30858, U.K. 1277723.

3,749,059.—APPARATUS FOR DEVELOPING ELECTROSTATIC LATENT IMAGE. JULY 31, 1973. AUS. 445683, BEL. 755061, CAN. 903579, FRA. 7029636, JAP. 48-25936, U.K. 1267888.

3,750,624.—APPARATUS FOR DEVELOPING ELECTROPHOTOGRAPHIC CONTINUOUS WEB MATERIAL. AUG. 7, 1973. AUS. 433381, BEL. 770250, CAN. 948843, FRA. 7126524, ITL. 948843, U.K. 1328313.

3,753,419.—ELECTROPHOTOGRAPHIC LIQUID DEVELOPING APPARATUS. AUG. 21, 1973. AUS. 430772, BEL. 768788, CAN. 334540, FRA. 7122426, ITL. 928531, U.K. 1337485.

3,766,887.—DEVELOPING DEVICE FOR ELECTROSTATIC LATENT IMAGE. OCT. 28, 1973. AUS. 429869, BEL.

761227, CAN. 102437, FRA. 2075270, ITL. 919235, U.K. 1310092.

Class 5E

3,774,574.—DEVELOPMENT DEVICE FOR ELECTROPHOTOGRAPHY. NOV. 27, 1973. FRA. 7143873.
3,783,827.—LIQUID DEVELOPMENT APPARATUS FOR ELECTROPHOTOGRAPHY. JAN. 8, 1974. BEL. 777528, CAN. 949309, FRA. 7147339, ITL. 945720.
3,784,397.—IMAGING SYSTEM. JAN. 8, 1974. ARG. 185194, JAP. 1348667, MEX. 120938.
3,788,930.—METHOD OF FIXING IMAGES OBTAINED BY LIQUID DEVELOPMENT IN ELECTROPHOTOGRAPHY. JAN. 29, 1974. BEL. 774763.
3,796,187.—APPARATUS FOR DEVELOPING CONTINUOUS ELECTROPHOTOGRAPHIC PHOTOSENSITIVE WEB MATERIAL. MAR. 12, 1974. BEL. 769412, CAN. 934541, FRA. 7123852, ITL. 934462, U.K. 1332534.
3,804,659.—ELECTROPHOTOGRAPHIC REVERSAL DEVELOPMENT PROCESS FOR ENHANCING THE QUALITY OF THE DEVELOPED IMAGE. APR. 16, 1974. FRA. 7144069, JAP. 49-26901.
3,817,212.—ELECTROSTATOGRAPHIC LIQUID DEVELOPMENT APPARATUS. JUNE 18, 1974. U.K. 1310448.
3,836,384.—IMAGING SYSTEMS. SEPT. 17, 1974. JAP. 46-43198.

Class SE4

3,577,259.—LIQUID DEVELOPMENT OF ELECTROSTATIC LATENT IMAGES UTILIZING A TOWER-FREE ZONE. MAY 4, 1971. AUS. 418640, CAN. 871081, FRA. 1592038, JAP. 46-11633, U.K. 1252917.
3,592,678.—LIQUID DONOR DEVELOPMENT WITH ELECTROPHORETIC CLEANING. JULY 13, 1971. CAN. 939733, JAP. 48-34774, U.K. 1261752.
3,597,368.—LIQUID DEVELOPER FOR ELECTROPHOTOGRAPHY CONTAINING YELLOW PIGMENT. AUG. 3, 1971. BEL. 719289, CAN. 846.122, FRA. 1578390, JAP. 46-10480, U.K. 1201134.

Class 5I1

3,537,427.—ELECTROSTATIC LATENT IMAGE DEVELOPING DEVICE. NOV. 3, 1930. BEL. 722040, JAP. 46-14440, U.K. 1239635.
3,607,342.—METHOD OF DEVELOPMENT OF ELECTROSTATIC IMAGES. SEPT. 21, 1971. BEL. 707253, FRA. 1555753, JAP. 44-9878, U.K. 1204548.
3,627,557.—LIQUID DEVELOPMENT BY REDUCING THE VISCOSITY OF THE DEVELOPER ON A ROLLER APPLICATION PRIOR TO DEVELOPMENT. DEC. 14, 1971. CAN. 905230, U.K. 1303499.

Class 5J

3,713,422.—APPARATUS FOR DEVELOPING AN ELECTROSTATIC LATENT IMAGE BY LIQUID DEVELOPMENT. JAN. 30, 1973. BEL. 764267, CAN. 932954, FRA. 7109086, GER. 763,992, U.K. 1341631.
3,750,624.—APPARATUS FOR DEVELOPING ELECTROPHOTOGRAPHIC CONTINUOUS WEB MATERIAL. AUG. 7, 1973. AUS. 433381, BEL. 770250, CAN. 948843, FRA. 7126524, ITL. 937783, U.K. 1328313.

Class 5J1

3,620,798.—DEVELOPMENT OF LATENT ELECTROSTATIC IMAGE EMPLOYING NOVEM DEVELOPMENT ELECTRODE. NOV. 16, 1971. BEL. 709410, FRA. 1552425, U.K. 1186841.
3,642,515.—LIQUID DEVELOPMENT UTILIZING A CURVILINEAR DEVELOPMENT ELECTRODE. FEB. 15, 1972. CAN. 867698.
3,655,419.—ELECTROPHOTOGRAPHIC REVERSAL DEVELOPING PROCESS. APR. 11, 1972. AUS. 432643, BEL. 741.440, CAN. 914.518, FRA. 6938659, ITL. 880.593, U.K. 1287.903.

Class 5J1

3,685,907.—ELECTROPHOTOGRAPHIC PROCESS. AUG. 22, 1972. AUS. 442703, BEL. 752387, CAN. 910132, FRA. 2-51297, ITL. 902170, U.K. 1292200.
3,783,827.—LIQUID DEVELOPMENT APPARATUS FOR ELECTROPHOTOGRAPHY. JAN. 8, 1974. BEL. 777528, CAN. 949309, FRA. 7147339, ITL. 945720.
3,836,384.—IMAGING SYSTEMS. SEPT. 17, 1974. JAP. 46-43198.

Class 5J2

3,774,574.—DEVELOPMENT DEVICE FOR ELECTROPHOTOGRAPHY. NOV. 27, 1973. FRA. 7143873.
3,784,397.—IMAGING SYSTEM. JAN. 8, 1974. ARG. 185194, MEX. 120938, U.K. 1348667.

Class 5J3

3,566,834.—ELECTROPHOTOGRAPHIC DEVELOPING DEVICE. MAR. 2, 1971. AUS. 417201, BEL. 718329, FRA. 1578391, JAP. 48-31853, U.K. 1194789.
3,672,330.—APPARATUS FOR DEVELOPING A LATENT ELECTROSTATIC IMAGE. JUNE 27, 1972. BEL. 708760, FRA. 149128, U.K. 1192600.

Class 5J5

3,560,203.—ELECTROPHOTOGRAPHIC DEVELOPING PROCESS. FEB. 2, 1971. FRA. 1604137, U.K. 1165038.
3,783,818.—ELECTROPHOTOGRAPHIC DEVELOPING PROCESS. JAN. 8, 1974. BEL. 781515, FRA. 7211409, ITL. 950927, U.K. 1358450.
3,784,397.—IMAGING SYSTEM. JAN. 8, 1974. ARG. 185194, MEX. 120938, U.K. 1348667.

Class 5K

3,724,941.—ELECTROPHOTOGRAPHIC APPARATUS. APR. 3, 1973.
3,762,811.—METHOD AND APPARATUS FOR ELECTROPHOTOGRAPHY. OCT. 2, 1973.

Class 5M

3,620,798.—DEVELOPMENT OF LATENT ELECTROSTATIC IMAGE EMPLOYING NOVEM DEVELOPMENT ELECTRODE. NOV. 16, 1971. BEL. 709410, FRA. 1552425, U.K. 1186841.
3,655,419.—ELECTROPHOTOGRAPHIC REVERSAL DEVELOPING PROCESS. APR. 11, 1972. AUS. 432643, BEL. 471.440, CAN. 914.518, FRA. 6938659, ITL. 880.593, U.K. 1287.903.

Class 5M

3,773,507.—ELECTROPHOTOGRAPHIC REVERSAL DEVELOPMENT PROCESS EMPLOYING A PRETONER. NOV. 20, 1973. AUS. 426720, BEL. 769893, CAN. 947812, FRA. 7124853, ITL. 934605, JAP. 49-5465, U.K. 1340947.

Class 5N

3,764,312.—ELECTROPHOTOGRAPHIC PROCESS. OCT. 9, 1973. FRA. 7146405, JAP. 49-26903.

Class 5N5

3,941,898.—DEVELOPING METHOD UTILIZING PULVERIZED, COLORED, CROSSLINKED, VINYLIC POLYMER RESIN AS TONER. MAR. 2, 1976.

Class 5O

3,476,659.—ELECTROPHOTOGRAPHIC IMAGING AND COPYING PROCESS. NOV. 4, 1969. BEL. 684406, FRA. 1489929, ITL. 773333, JAP. 43-27579, U.K. 1159394.
3,565,613.—ELECTROLYTIC ELECTROPHOTOGRAPHY. FEB. 23, 1971. GER. 1597849, JAP. 44-13679, U.K. 1202409.

Class 6B1

3,791,643.—CHAIN DELIVERY PAPER FEEDING DEVICE. FEB. 12, 1974. JAP. 48-20232.
3,927,877.—PAPER FEED TRAY FOR USE WITH COPYING MACHINE AND THE LIKE. DEC. 23, 1975.

Class 6C

3,901,427.—COPY PAPER FEEDER. AUG. 26, 1975.

Class 6D

3,924,848.—PAPER FEED APPARATUS FOR GRIPPER-TYPE PAPER TRANSPORT DEVICE. DEC. 9, 1975.
3,924,849.—PAPER GRIPPING DEVICE FOR USE WITH A CHAIN DRIVEN PAPER CARRIAGE. DEC. 9, 1975.

Class 6H

3,704,881.—TRANSFER SHEET PEELING DEVICE FOR XEROGRAPHIC APPARATUS. DEC. 5, 1972. CAN. 940546, U.K. 1275888.

Class 7C

3,764,207.—ELECTROPHOTOGRAPHIC PROCESS UTILIZING SINGLE CHARGING MEANS FOR EFFECTING SIMULTANEOUS FUNCTIONS OF CHARGING AND FACILITATING TONER IMAGE TRANSFER. OCT. 9, 1973.

Class 7E1

3,716,360.—MOLTEN IMAGE TRANSFER IN ELECTROPHOTOGRAPHY. FEB. 13, 1973. BEL. 763191, FRA. 7105717, GER. 2108080, ITL. 919905, U.K. 1313059.

Class 7E3A

3,549,359.—COLOR ELECTROPHOTOGRAPHY EMPLOYING DYE TRANSFER FROM A DYE-CONTAINING PHOTOSENSITIVE LAYER TO AN IMAGE RECEIVING SHEET. DEC. 22, 1970. FRA. 1524473, GER. 1,572,341, JAP. 45-40159, U.K. 1,183,532.

3,654,865.—METHOD FOR FORMING DYE IMAGE USING AN ELECTROPHOTOGRAPHIC DEVELOPER CONTAINING A GELATIN TONER. APR. 11, 1972. AUS. 435812, BEL. 745534, CAN. 924.951, FRA. 7004034, ITL. 888.447, JAP. 48-9017, U.K. 1257296.

Class 8A

3,825,407.—HEATER HOLDING BRACKET FOR A HEAT FIXER IN A COPYING MACHINE OR THE LIKE. JULY 23, 1974.

Class 8AB

3,806,314.—FIXING APPARATUS FOR THERMOPLASTIC RECORDING. APR. 23, 1974.

Class 8A1B

3,818,185.—HEAT FUSION-BONDING APPARATUS FOR ELECTROPHOTOGRAPHY. JUNE 18, 1974.

3,916,256.—PROTECTIVE CIRCUIT IN A TEMPERATURE REGULATOR FOR THE THERMAL FIXING DEVICE OF A DUPLICATOR. NOV. 4, 1975.

Class 8A2

3,904,786.—PROCESS FOR FIXING IMAGES BY CONTACT HEATING IN A DUPLICATOR. SEPT. 9, 1975.

Class 8A2A

3,788,930.—METHOD OF FIXING IMAGES OBTAINED BY LIQUID DEVELOPMENT IN ELECTROPHOTOGRAPHY. JAN. 29, 1974. BEL. 774763.

Class 8B

3,647,773.—SUSPENSION POLYMERIZATION IN THE PRESENCE OF A METHYL STYRENE. MAR. 7, 1972. BEL. 727179, FRA. 2000527, JAP. 47-909, U.K. 1251434.

Class 8C

3,385,699.—PROCESS FOR PROCESSING ELECTROPHOTOSENSITIVE LAYERS. MAY 28, 1968. BEL. 651039, FRA. 1402385, HOL. 130806, SWD. 310458, U.K. 1072476.

3,740,249.—SOLVENT FIXING PROCESS. JUNE 19, 1973. JAP. 49-26591.

Class 9A

3,488,896.—PROCESS OF PUMICING A SURFACE. JAN. 13, 1970. FRA. 1,474,687, ITL. 782,665, JAP. 44-12197, U.K. 1,143,923.

3,936,183.—ELECTROPHOTOGRAPHIC COPYING MACHINE WITH IMPROVED CLEANING BLADE. FEB. 3, 1976.

Class 9A1

3,766,592.—DRUM CLEANING DEVICE FOR AN ELECTROPHOTOGRAPHIC DUPLICATOR. OCT. 23, 1973.

Class 9B3

3,671,290.—IMAGING SYSTEM. JUNE 20, 1972. CAN. 917486, JAP. 48-8134, U.K. 1278858.

Class 9B3

3,703,400.—DEVELOPING METHOD FOR ELECTROPHOTOGRAPHY. NOV. 21, 1972. AUS. 435816, BEL. 748.590, CAN. 898073, FRA. 7012445, GER. 2016586, ITL. 903950, U.K. 1251623.

Class 10A, 10E

3,922,662.—DETECTOR FOR USE WITH A DUPLICATOR OR THE LIKE FOR DETECTING INCORRECTLY ALIGNED DOCUMENTS. NOV. 25, 1975.

Class 14A5

3,937,883.—BRAKING CIRCUIT FOR USE WITH PHASE SYNCHRONIZING CIRCUITRY. FEB. 10, 1976.

Class 15

3,795,187.—IMPELLERS FOR IMPACT PRINTERS. MAR. 5, 1974.

Class 17B1

3,687,538.—APPARATUS FOR EXPOSING LATENT IMAGE MARGINS IN ELECTROPHOTOGRAPHIC COPYING APPARATUS. AUG. 29, 1972. CAN. 931204, U.K. 1350795.

Class 17D3

3,936,664.—METHOD AND APPARATUS FOR GENERATING CHARACTER PATTERNS. FEB. 3, 1976.

Class 18A

3,417,733.—APPARATUS FOR VACUUM COATING. DEC. 24, 1968. FRA. 1,415,251, GER. 1,521,238. JAP. 40-26402, U.K. 1,081,324.

Class 18A

3,730,711.—PHOTOCONDUCTIVE MATERIAL FOR ELECTROPHOTOGRAPHY. MAY 1, 1973. BEL. 754699, CAN. 925087, FRA. 754699, GER. 2040152, JAP. 48-32381, U.K. 1272720.

3,799,340.—REFINING PHOTOCONDUCTIVE PARTICLE. MAR. 26, 1974. BEL. 776110, CAN. 944204, FRA. 714325.

Class 18A1

3,589,928.—PROCESS FOR THE PRODUCTION OF A LIGHT SENSITIVE MATERIAL FOR ELECTROPHOTOGRAPHY. JUNE 29, 1971. BEL. 685072, FRA. 1500187, GER. 1,522,603, JAP. 44-23775, U.K. 1139532.

3,607,363.—PROCESS FOR PRODUCING PHOTOCONDUCTIVE MATERIAL. SEPT. 21, 1971. U.K. 1210071.

3,625,747.—PHOTOCONDUCTIVE POWDERS AND A METHOD FOR PRODUCING THE SAME. DEC. 7, 1971.

3,634,333.—PROCESS FOR COATING ZINC OXIDE POWDER WITH CADMIUM SULFIDE. JAN. 11, 1972. BEL. 731056, CAN. 882.627, FRA. 2.005.849, GER. 1916761, JAP. 47-49616, U.K. 1215685.

Class 18A1

3,682,825.—PROCESS FOR THE PRODUCTION OF ELECTROPHOTOGRAPHIC LIQUID DEVELOPER CONTAINING GELATIN. AUG. 8, 1972. AUS. 424258, BEL. 745390, CAN. 924165, FRA. 7003324, GER. 2004817, ITL. 887410, JAP. 48-7819, U.K. 1255762.

3,729,419.—LIQUID DEVELOPER. APR. 24, 1973. AUS. 451254, FRA. 71.09434, JAP. 48-43157, U.K. 1341627.

3,743,537.—METHOD OF MAKING ELECTROPHOTOGRAPHIC RECORDING MEMBER. JULY 3, 1973. AUS. 430736, ATR. 305766, BEL. 757.393, CAN. 928165, FRA. 7037234, ITL. 917004, JAP. 49-3846, U.K. 1269306.

3,755,177.—PROCESS OF MAKING LIQUID ELECTROSTATIC DEVELOPERS CONTAINING GELATIN. AUG. 28, 1973. AUS. 443292, CAN. 925743, JAP. 48-7820, U.K. 1284646.

3,803,011.—PROCESS FOR PREPARING 2, 3-DIHYDRO-1H,6H-1,5-BENZODIAZOCINE-2-ONE DERIVATIVE. APR. 9, 1974.

Class 18A2

3,761,261.—PHTHALOCYANINE DYE SENSITIZERS FOR ZINC OXIDE. SEPT. 25, 1973.

Class 18AB

3,806,314.—FIXING APPARATUS FOR THERMOPLASTIC RECORDING. APR. 23, 1974.

Class 18A3

3,661,572.—MANUFACTURING PROCESS FOR MANUFACTURING ELECTROPHOTOGRAPHIC SENSITIVE MATERIAL. MAY 9, 1972. AUS. 429948, BEL. 754323, CAN. 754323, FRA. 7028557, GER. 2038762, ITL. 902691, U.K. 1305298.

Class 18B

3,548,035.—SUSPENSION POLYMERIZATION PROCESS. DEC. 15, 1970. FRA. 1559138, GER. 1720782, JAP. 45-40052, U.K. 1185775.

3,625,747.—PHOTOCONDUCTIVE POWDERS AND A METHOD FOR PRODUCING THE SAME. DEC. 7, 1971.

3,647,773.—SUSPENSION POLYMERIZATION IN THE PRESENCE OF METHYL STYRENE. MAR. 7, 1972. BEL. 727179, FRA. 2000527, JAP. 47-909, U.K. 1251434.

3,668,126.—METHOD OF PRODUCING ELECTROPHOTOGRAPHIC LIQUID DEVELOPERS HAVING VERY FINE COLORING MATERIAL. JUNE 6, 1972. BEL. 709625, FRA. 1562934, U.K. 1218064.

Class 18B

3,697,266.—ORGANIC PHOTOCONDUCTIVE MATERIALS FOR ELECTROPHOTOGRAPHY. OCT. 10, 1972. BEL. 761043, CAN. 915493, FRA. 2074451, ITL. 913992, JAP. 48-38429, U.K. 1323109.

3,716,505.—PROCESS FOR SUSPENSION POLYMERIZATION. FEB. 13, 1973. FRA. 2048682, GER. 2025104, JAP. 47-23406, U.K. 1316693.

Class 18C

3,622,515.—ELECTROPHOTOGRAPHIC LIQUID DEVELOPER HAVING A PROTEOLYTIC ENZYME. NOV. 23, 1971. AUS. 436813, BEL. 732273, CAN. 896948, FRA. 2007.520, ITL. 867188, JAP. 47-17879, U.K. 1231544.

3,718,593.—PROCESS FOR THE PRODUCTION OF AN ELECTROPHOTOGRAPHIC LIQUID DEVELOPER CONTAINING GELATIN. FEB. 27, 1973. AUS. 438586, BEL. 745535, CAN. 924166, FRA. 7004034, ITL. 888743, JAP. 48-7822, U.K. 1255763.

3,740,249.—SOLVENT FIXING PROCESS. JUNE 19, 1973. JAP. 49-26591.

Class 18C2A1

3,704,119.—ELECTROPHOTOGRAPHIC PROCESS USING TONER OF SAME REFRACTIVE INDEX AS ORGANIC PHOTOCONDUCTIVE LAYER. NOV. 28, 1972. AUS. 433360, BEL. 754544, FRA. 7028556, ITL. 902771, JAP. 48-21054, U.K. 1321065.

Class 18C2A2

3,668,126.—METHOD OF PRODUCING ELECTROPHOTOGRAPHIC LIQUID DEVELOPERS HAVING VERY FINE COLORING MATERIAL. JUNE 6, 1972. BEL. 709625, FRA. 1562934, U.K. 1218064.

3,682,825.—PROCESS FOR THE PRODUCTION OF ELECTROPHOTOGRAPHIC LIQUID DEVELOPER CONTAINING GELATIN. AUG. 8, 1972. AUS. 424258, BEL. 745390, CAN. 924165, FRA. 7003324, GER. 2004817, ITL. 887410, JAP. 48-7819, U.K. 1255762.

Class 18C5A

3,597,368.—LIQUID DEVELOPER FOR ELECTROPHOTOGRAPHY CONTAINING YELLOW PIGMENT. AUG. 3, 1971. BEL. 719289, CAN. 846.122, FRA. 1578390, JAP. 46-10480, U.K. 1201134.

3,738,832.—COLOR ELECTROPHOTOGRAPHIC PROCESS EMPLOYING LIQUID DEVELOPER CONTAINING GELATIN. JUNE 12, 1973. CAN. 921746, JAP. 47-30858, U.K. 1277723.

Class 20A3

3,753,419.—ELECTROPHOTOGRAPHIC LIQUID DEVELOPING APPARATUS. AUG. 21, 1973. AUS. 430722, BEL. 768788, CAN. 334540, FRA. 7122426, ITL. 928531, U.K. 1337485.

3,817,212.—ELECTROSTATOGRAPHIC LIQUID DEVELOPMENT APPARATUS. JUNE 18, 1974. U.K. 1310448.

Class 20B3

3,544,458.—METHOD OF FILTERING. DEC. 1, 1970. BEL. 732578, CAN. 888335.

Class 20C

3,707,139.—LIQUID TYPE ELECTROPHOTOGRAPHY DEVELOPING APPARATUS. DEC. 26, 1972. BEL. 756409, CAN. 918413, FRA. 7034577, GER. 1314865.

Class 20C2

3,753,466.—AUTOMATIC FIRE EXTINGUISHER IN ELECTROPHOTOGRAPHIC COPYING MACHINE OR THE LIKE. AUG. 21, 1973. U.K. 1334579.

Class 10C4

3,704,881.—TRANSFER SHEET PEELING DEVICE FOR XEROGRAPHIC APPARATUS. DEC. 5, 1972. CAN. 940546, U.K. 1275888.

Class 20D

3,653,292.—AUTOMATIC CONTOUR TRACING DEVICE. APR. 4, 1972. FRA. 7204547, GER. 2033094, U.K. 1295128.

Class 20D

3,825,407.—HEATER HOLDING BRACKET FOR A HEAT FIXER IN A COPYING MACHINE OR THE LIKE. JULY 23, 1974.

Class 20D1

3,791,643.—CHAIN DELIVERY PAPER FEEDING DEVICE. FEB. 12, 1974. JAP. 48-20232.

Class 20G

3,795,187.—IMPELLERS FOR IMPACT PRINTERS. MAR. 5, 1974.

Class 20I

1,341,664.—METAL DRAWING APPARATUS. APR. 24, 1974.

Class 25A4

3,952,167.—ELECTROMAGNETIC COUPLER FOR USE WITH A TELEPHONE SET. APR. 20, 1976.

Class 25C2

1,341,631.—CIRCUIT INTERRUPTER. APR. 24, 1974. BEL. 764267, CAN. 932954, FRA. 7109086.

3,846,647.—TRIGGER CIRCUIT FOR USE WITH MULTIVIBRATORS. NOV. 5, 1974.

Class 25C4

3,838,344.—FREQUENCY MULTIPLYING CIRCUIT. SEPT. 24, 1974.

Class 25C5

3,936,675.—REFERENCE POINT POTENTIAL COMPENSATING CIRCUIT FOR USE WITH PHASE CONTROLLER. FEB. 3, 1976.

Class 27D

3,779,206.—APPARATUS FOR SCRAPING LIQUID OFF OF SHEET MATERIAL. DEC. 18, 1973.

Class 32

347,552.—PRUNING IMPLEMENT. OCT. 28, 1969. FRA. 1526838, ITL. 780781, JAP. 42-19145, U.K. 1102436.

3,813,262.—RESIN-IMPREGNATED TISSUE OVERLAYS. MAY 28, 1974. BEL. 777312, FRA. 7146406, ITL. 945655.

Class 32B

3,273,450.—DATA PROCESSING APPARATUS. NOV. 15, 1963. FRA. 1384061, GER. 1449563, GRB. 1048048, JAP. 629392.

Xerox Patents

Class 1

RE.27,876.—DISPENSING APPARATUS. JAN. 8, 1974. CAN. 0868818.

Class 1A

2,573,881.—METHOD AND APPARATUS FOR DEVELOPING ELECTROSTATIC IMAGES WITH ELECTROSCOPIC POWDER. NOV. 6, 1951. AUS. 0149247, CAN. 0479868, GER. 0903414, GRB. 0693905, STZ. 0286142, SWD. 0171735.

3,877,936.—PHOTOCONDUCTIVE COPOLYMER OF N-VINYLCARBAZOLE AND N-VINYLPHTHALIMIDE. APR. 15, 1975. BEL. 0812436.

3,961,954.—ACID SENSITIZED CHARGE TRANSFER COMPLEXES AND CYCLIC ELECTRSTATOGRAPHC IMAGNG METH-ACID SENSITIZATN. JUNE 8, 1976.

Class 1A 1

3,607,261.—INORGANIC CRYSTALLINE BINDERS FOR ELECTROPHOTOGRAPHIC PLATES. SEPT. 21, 1971.

3,850,631.—PHOTOCONDUCTIVE ELEMENT WITH A POLYVINVLIDENE FLUORIDE BINDER. NOV. 26, 1974.

3,928,036.—FLEXIBLE XEROGRAPHIC PHOTORECEPTOR ELEMENT. DEC. 23, 1975.

Class 1A 1A

2,886,434.—PROTECTED PHOTOCONDUCTIVE ELEMENT AND METHOD OF MAKING SAME— HORIZONS. MAY 12, 1959. CAN. 0621931.

2,970,906.—XEROGRAPHIC PLATE AND A PROCESS OF COPY MAKING. FEB. 7, 1961. CAN. 0576158.

3,011,474.—XEROGRAPHIC DEVELOPMENT ELECTRODE APPARATUS. DEC. 5, 1961. CAN. 0701149, GRB. 0948138.

3,041,166.—XEROGRAPHIC PLATE AND METHOD. JUNE 26, 1962. CAN. 0617821, GRB. 0936649.

3,174,855.—METHOD FOR A PRODUCTION OF A XEROGRAPHIC PLATE. MAR. 23, 1965.

3,251,686.—XEROGRAPHIC PROCESS. MAY 17, 1966. FRA. 1292831, GER. 1243979, GRB. 0996972, JAP. 0416023.

3,312,547.—XEROGRAPHIC PLATE AND PROCESSES OF MAKING AND USING SAME. APR. 4, 1967.

3,341,326.—DARK DECAY CONTROLLED XEROGRAPHY. SEPT. 12, 1967. AUS. 0285843, CAN. 0729829, FRA. 1377592, GRB. 1029199, ITL. 0706101.

3,352,669.—PHOTOCONDUCTIVE MEMBER AND PROCESSES OF PREPARING AND USING SAME. NOV. 14, 1967. AUS. 0405164, CAN. 0834670, FRA. 1422625, GER. 1497194, GRB. 1052970, HOL. 0137891, ITL. 0749420, JAP. 0501912.

3,508,918.—XEROGRAPHIC PLATE CONTAINING ALUMINUM SELENIDE BARRIER LAYER. APR. 28, 1970. CAN. 0872175.

3,532,496.—XRGRPHC PLTS AND PROCS EMPLYNG HMGNUS DISPRSNS OF VTREOUS SLNIUM AND SNSTZNG DYES AS PHTCNDCTV LAYER. OCT. 6, 1970.

3,621,248.—METHOD USING XERORADIOGRAPHIC PLATE INSENSITIVE TO VISIBLE LIGHT. NOV. 16, 1971.

3,645,729.—METHOD OF TRANSFERRING ELECTROSTATIC LATENT IMAGES USING MULTIPLE PHOTOCONDUCTIVE LAYERS. FEB. 29, 1972.

3,690,252.—LITHOGRAPHIC INKING APPARATUS. SEPT. 12, 1972. CAN. 0919006.

3,930,853.—ACCELERATING AGING METHOD FOR SELENIUM ARSENIC PHOTOCONDUCTORS. JAN. 6, 1976.

Class 1A 1B

2,745,327.—ELECTROPHOTOGRAPHIC PROCESS. MAY 15, 1956.

2,803,542.—XEROGRAPHIC PLATE. AUG. 20, 1957. CAN. 0603581, FRA. 1181499, GRB. 0876569.

2,863,768.—XEROGRAPHIC PLATE. DEC. 9, 1958.

3,312,548.—XEROGRAPHIC PLATES. APR. 4, 1967. BEL. 0691217, CAN. 0819658, FRA. 1505803, GRB. 1165579, JAP. 0650232.

3,355,289.—CYCLICAL XEROGRAPHIC PROCESSD UTILIZING A SELENIUM-TELLURIUM XEROGRAPHIC PLATE. NOV. 28, 1967.

3,427,157.—XEROGRAPHIC PROCESS UTILIZING A PHOTOCONDUCTIVE ALLOY OF THALLIUM IN SELNIUM. FEB. 11, 1969. CAN. 0834085, FRA. 1461161, GRB. 1132993, ITL. 0749553, JAP. 0534762, MEX. 0085232.

3,489,560.—PHOTOCONDUCTIVE LAYR COMPRISN SELENIUM COMPOUND AND SOLID HYDROPHOBIC METL SALT OF A FATTY ACID. JAN. 13, 1970. BEL. 0711297, CAN. 0871632, FRA. 1544448, GRB. 1203237, ITL. 0815227, JAP. 0632160.

3,490,903.—ALLOYS OF ANTIMONY AND SELENIUM USED IN PHOTOCONDUCTIVE ELEMENTS. JAN. 20, 1970. AUS. 0412949, CAN. 0871074, FRA. 1533536, GRB. 1185389, ITL. 0805955, JAP. 0626127, SWD. 0318193.

3,511,649.—PROCESS OF REDUCING FATIGUE IN PHOTOCONDUCTIVE GLASSES. MAY 12, 1970. GRB. 1193472, JAP. 0604152.

3,524,745.—PHOTOCONDUCTIVE ALLOY OF ARSENIC ANTIMONY AND SELENIUM. AUG. 18, 1970. ARG. 0164055, AUS. 0410443, BEL. 0709132, CAN. 0884810, CHL. 0024255, FRA. 1550902, GRB. 1209971, IND. 0113988, ITL. 0833508, JAP. 9124370, LXB. 0055231, MEX. 0108993, NOR. 0127943, NZL. 0151243, PRU. 0009904, PTG. 0048919, SAF. 0680228, SPN. 0349235, STZ. 0495573, SWD. 0328189, URG. 0009683.

3,645,729.—METHOD OF TRANSFERRING ELECTROSTATIC LATENT IMAGES USING MULTIPLE PHOTOCONDUCTIVE LAYERS. FEB. 29, 1972.

3,690,252.—LITHOGRAPHIC INKING APPARATUS. SEPT. 12, 1972. CAN. 0919006.

3,709,683.—INFRARED SENSITIVE IMAGE RETENTION PHOTORECEPTOR. JAN. 9, 1973.

3,874,917.—METHOD OF FORMING VITREOUS SEMICONDUCTORS BY VAPOR DEPOSITING BISMUTH AND SELENIUM. APR. 1, 1975.

Class 1A 1C

2,937,944.—XEROGRAPHIC LIGHT-SENSITIVE MEMBER AND PROCESS THEREFOR. MAY 24, 1960. AUS. 0242066, BEL. 0586070, CAN. 0610194, FRA. 1243723, GER. 1165408, GRB. 0894371, ITL. 0620746, JAP. 0318674, STZ. 0394806.

3,008,825.—XEROGRAPHIC LIGHT-SENSITIVE MEMBER AND PROCESS THEREFOR. NOV. 14, 1961. CAN. 0610195.

3,077,398.—XEROGRAPHIC PLATE MADE BY CAST COATING. FEB. 12, 1963.

3,080,251.—METHOD OF XEROGRAPHIC DEVELOPMENT. MAR. 5, 1963.

3,121,006.—PHOTO-ACTIVE MEMBER FOR XEROGRAPHY. FEB. 11, 1964. ARG. 0147758, BEL. 0656892, CAN. 0674311, CHL. 0020455, CLB. 0014118, ECD. 0000029, GUA. 0001696, PRU. 0009656, TRK. 0012835, URG. 0006526, VZL. 0016353.

3,121,007.—PHOTO-ACTIVE MEMBER FOR XEROGRAPHY. FEB. 11, 1964.

3,140,174.—PROCESS FOR OVERCOATING A XEROGRAPHIC PLATE. JULY 7, 1964. GRB. 0960871.

3,151,982.—XEROGRAPHIC PLATE. OCT. 6, 1964. ARG. 0149584, ATR. 0247148, AUS. 0275834, BEL. 0630478, BRA. 0088013, CAN. 0879017, DNK. 0116787, FRA. 1359402, GER. 1497054, GRB. 1049872, GRK. 0026268, HOL. 0139212, IND. 0086999, ISR. 0018877, ITL. 0701505, JAP. 0489512, LXB. 0043461, MEX. 0081663, NOR. 0108058, NZL. 0134420, PTG. 0040700, SAF. 0001331, SPN. 0286492, STZ. 0450173, SWD. 0313998.

3,251,686.—XEROGRAPHIC PROCESS. MAY 17, 1966. FRA. 1292831, GER. 1243979, GRB. 0996972, JAP. 0416023.

3,379,527.—PHOTOCONDUCTIVE INSULATORS COMPRISING ACTIVATED SULFIDES SELENIDES AND SULFOSELENIDES OF CADMIUM. APR. 23, 1968. CAN. 0907921, GRB. 1079065.

3,519,420.—METHOD OF CHARGING A ZINC OXIDE PHOTOCONDUCTIVE LAYER WITH A POSITIVE CHARGE. JULY 7, 1970.

3,522,040.—PHOTOSENSITIVE INSULATING MATERIAL. JULY 28, 1970. CAN. 0884808, GRB. 1171910, JAP. 0552966.

3,941,594.—ELECTROPHOTOGRAPHIC ELEMENT WITH ZNO AND TIO2. MAR. 2, 1976.

3,969,113.—PHOTOSENSITIVE BINDER LAYER FOR XEROGRAPHY CONTAINING TITANIUM OXIDE AND A CADMIUM PIGMENT. JULY 13, 1976.

Class 1A 1E

3,469,978.—PHOTOSENSITIVE ELEMENT. SEPT. 30, 1969. CAN. 0872173, GRB. 1171909, JAP. 0552967.

Class 1A 1F

3,288,604.—IMAGING METHOD USING AN ELEMENT HAVING A GLASS OVERCOATING. NOV. 29, 1966. CAN. 0815735.

3,397,982.—XIC PLATE W/INORGANIC GLASS BINDER HAVING OVERCOATING CONSISTING ESSENTIALLY OF ALUMINUM OXIDE. AUG. 20, 1968. ARG. 0150690, AUS. 0407349, BEL. 0674140, CAN. 0866142, FRA. 1460232, GER. 1497230, GRB. 1129674, ITL. 0822914, JAP. 0531894, MEX. 0085270, SWD. 0319976.

3,507,646.—ELECTROPHOTOGRAPHIC PROCESS USING A SINGLE PHASE PHOTOCONDUCTIVE GLASS IMAGING LAYER. APR. 21, 1970. ARG. 0164449, AUS. 0416137, BEL. 0691757, CAN. 0818383, FRA. 1511172, GER. 1522713, GRB. 1167520, ITL. 0787661, JAP. 0567233, MEX. 0105237, SPN. 0334896, STZ. 0472707, SWD. 0331793, VZL. 0024006.

3,565,713.—METHOD OF FORMING A CERAMIC IMAGE ON A CERAMIC SUBSTRATE. FEB. 23, 1971.

Class 1A 2

3,738,831.—CHALCOGEN ORGANIC COMPOUNDS USED IN ELECTROPHOTOGRAPHIC PLATES AND PROCESS. JUNE 12, 1973.

3,758,301.—ELECTROPHOTOGRAPHIC USE OF SELENIUM CONTAINING POLYMERS. SEPT. 11, 1973.

3,770,428.—ORGANIC PHOTOCONDUCTIVE MATERIAL. NOV. 6, 1973.

3,850,631.—PHOTOCONDUCTIVE ELEMENT WITH A POLYVINVLIDENE FLUORIDE BINDER. NOV. 26, 1974.

3,864,144.—PROCESS FOR PREPARATION OF PHOTOCONDUCTIVE FILMS FROM INTRACTABLE MATERIALS. FEB. 4, 1975. GRB. 1414158, TIW. 0008534.

3,879,198.—ELECTROPHOTOGRAPHIC AMBIPOLAR PHOTOCONDUCTIVE COMPOSITION AND IMAGING METHOD. APR. 22, 1975.

3,882,087.—ORGANIC PHOTOCONDUCTIVE MATERIAL. MAY 6, 1975.

3,903,107.—DIRECT ALPHA TO X PHASE CONVERSION OF METAL CONTAINING PHTHALOCYANINE. SEPT. 2, 1975. BEL. 0815632, SAF. 0743536.

3,915,704.—PHOTOINDUCED ACID CATALYZED DEGRADATION OF DEGRADABLE POLYMERS. OCT. 28, 1975.

3,917,483.—PHOTOINDUCED ACID CATALIZED DEPOLYMERIZATION OF DEGRADABLE POLYMERS. NOV. 4, 1975.

3,923,762.—PROCESS FOR PREPARATION OF 2-ANTHRYL AND SUBSTITUTED 2-ANTHRYL FUNCTIONAL MONOMERS AND P. DEC. 2, 1975. BEL. 0822305, STZ. 0032598.

3,932,180.—DIRECT ALPHA TO X PHASE CONVERSION OF METAL-FREE PHTHALOCYANINE. JAN. 13, 1976. BEL. 0815632, SAF. 0743536.

3,943,108.—PHOTOCONDUCTIVE COMPOSITION OF AN ALDEHYDE CONDENSATE. MAR. 9, 1976.

3,951,658.—COLOR MODIFYING IMAGING METHOD AND ARTICLE. APR. 20, 1976.

3,954,906.—AMBIPOLAR PHOTOCONDUCTIVE COMPOSITION AND IMAGING METHOD. MAY 4, 1976.

Class 1A 2A

3,081,165.—XEROGRAPHIC CHEMOGRAPHY. MAR. 12, 1963. CAN. 0618594, GRB. 0977904.

3,432,415.—ELECTROPHORETIC IMG. PROCESS USING PHOTOSENSITIVE XANTHENONIUM SALTS. MAR. 11, 1969. AUS. 0439502, BEL. 0743895, CAN. 0851118, GER. 1522701, GRB. 1155747, JAP. 0650631, MEX. 0104632.

3,442,781.—PHOTOELECTROPHORETIC AND XEROGRAPHIC IMG. PROC. EMPL. TRIPHENODIOXAZINES AS ELECTRIC. PHOTOSENSIT. MAY 6, 1969. BEL. 0743894, CAN. 0855152, GRB. 0175452, JAP. 0611634.

3,445,225.—ELECTROPHOTOGRAPHIC IMAGING PROCESS. MAY 20, 1969. CAN. 0846121.

3,445,227.—ELECTROPHOTOGRAPHIC IMAGING PROCESSES EMPLOYING 2,4 DIAMINOTRIAZINES AS ELCTRCLY PHOTOSNSTV PRT. MAY 20, 1969. BEL. 0743891, CAN. 0852681, GER. 1522687, GRB. 1146019, JAP. 0617789.

3,448,028.—N-SBSTUD-8,13-DIOXODINAPHTHO-2-1-B,2,3-D-FURAN-6-CARBOXAMIDES AS ELCTLY PTOSNSTV MTLS IN ELCPHG. JUNE 3, 1969.

3,448,029.—ELECTROPHORETIC IMAGING PROCESS USING 8,13-DIOXODINAPTHO-2,1-B,2,3-D-FURAN-6-CARBOXAMIDE PIGMEN. JUNE 3, 1969.

3,448,030.—ELECTRICALLY PHOTOSENSITIVE PART. USEFUL IN PHOTOELECTROPHORETIC AND XEROGRAPHIC IMAGING PROCESSE. JUNE 3, 1969. BEL. 0743893, CAN. 0943830, GRB. 1155554, JAP. 0686735.

3,482,970.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS USING NAPHTHYLAZO COMPOUNDS AS THE PRIMARY PHOTOCONDUCTOR. DEC. 9, 1969. AUS. 0453397, BEL. 0742978, CAN. 0869486, GRB. 1296390, ITL. 0878843, JAP. 0725059.

3,607,261.—INORGANIC CRYSTALLINE BINDERS FOR ELECTROPHOTOGRAPHIC PLATES. SEPT. 21, 1971.

3,615,409.—ELCTROPHOTOGRPHC PLATE AND PROCESS EMPLOYING A PHTODNDCTV PIGMNT OF GENERAL FORMULA R2 N4 S3. OCT. 26, 1971.

3,640,710.—PHTHALOCYANINE PHOTOCONDUCTIVE ELEMENTS CONTAINING MULTIPLE BINDER MATERIALS. FEB. 8, 1972. ARG. 0184666, ATR. 0328861, AUS. 0456430, BEL. 0760751, CAN. 0933012, FRA. 7047636, GRB. 1333605, ITL. 0913999, PNM. 0002243, STZ. 0554550, SWD. 0365878, TIW. 0006738, USR. 0450420, VZL. 0032928.

3,672,979.—METHOD OF PRODUCING A PHTHALOCYANINE PHOTOCONDUCTIVE LAYER. JUNE 27, 1972. ARG. 0184673, AUS. 0457271, BEL. 0761135, CAN. 0951697, FRA. 7047702, GRB. 1334060, ITL. 0914074, JAP. 0753795, MEX. 0119529, PNM. 0002191, SPN. 0386759, STZ. 0571731, TIW. 0007180, VZL. 0032789.

3,708,292.—PI-FORM METAL PHTHALOCYANINE. JAN. 2, 1973. ARG. 0194234, BEL. 0783793, GRB. 1396922, ITL. 0955644, MEX. 0128928.

3,789,216.—PHOTODETECTION DEVICE AND METHOD COMPRISING PHTHALOCYANINE. JAN. 29, 1974.

3,865,798.—PHOTOACTIVE POLYMERS INDUCED EXOCYCLIC QUARTET CONCEPT. FEB. 11, 1975. AUS. 0462805, BEL. 0790689, FRA. 7237458, GRB. 1411998, ITL. 0969902, MEX. 0133728, SPN. 0407984, STZ. 0028515.

3,895,945.—PROCESS FOR PREPARATION OF A DYESTUFF SENSITIZED PHOTOCONDUCTIVE COMPOSITION. JULY 22, 1975.

3,923,762.—PROCESS FOR PREPARATION OF 2-ANTHRYL AND SUBSTITUTED 2-ANTHRYL FUNCTIONAL MONOMERS AND P. DEC. 2, 1975. BEL. 0822305, STZ. 0032598.

3,951,654.—MTHD ENHNCMT RATE AND EFFICIENCY OF PHOTODSCHG OF ELCTRPHGRIC IMAGING MEMBERS COMPRSNG PHTHALOCYA. APR. 20, 1976.

3,970,602.—COPOLYMERS OF N-VINYLCARBAZOLE AND N-VINYLPHTHALIMIDE AND DERIVATIVES THEREOF. JULY 20, 1976. BEL. 0812436.

Class 1A 2B

3,408,182.—ELECTROPHOTOGRAPHIC MATERIALS AND METHODS EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRANSFER COMP. OCT. 29, 1968. CAN. 0847805, FRA. 1463743, GRB. 1137665, ITL. 0755290, JAP. 0572185, MEX. 0107318.

3,408,183.—ELECTROPHOTOGRAPHIC MATERIALS AND METHODS EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRANSFER COMP. OCT. 29, 1968. CAN. 0819066, FRA. 1463745, GER. 1522676, GRB. 1126048, ITL. 0755287, JAP. 0727091, MEX. 0106758.

3,408,184.—ELECTROPHOTOGRAPHIC MATERIALS AND METHODS EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRNSFR COMPLE. OCT. 29, 1968. CAN. 0818382, FRA. 1463727, GRB. 1137664, ITL. 0755289, JAP. 0726382, MEX. 0105835.

3,408,185.—ELECTROPHOTOGRAPHIC MATERIALS AND METHOD EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRANSFER COMP. OCT. 29, 1968. CAN. 0848383, FRA. 1463728, GER. 1645192, GRB. 1137476, ITL. 0755291, MEX. 0106763.

3,408,186.—ELECTROPHOTOGRAPHIC MATERIALS AND METHODS EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRNSFR COMPLE. OCT.29,1968. CAN. 0846736, FRA. 1463746, GRB. 1138629, ITL. 0755288, JAP. 0569483, MEX. 0106589.

3,408,187.—ELECTROPHOTOGRAPHIC MATER AND METH EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRANSFER COMPLEXES. OCT. 29, 1968. CAN. 0867298, GER. 1522721, GRB. 1163097, JAP. 0797719.

3,408,188.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS COMPRISING PHOTOCONDUCTIVE CHARGE TRANSFER COMPLEXES. OCT. 29, 1968. CAN. 0869485, GRB. 1183516, JAP. 0797720.

3,408,189.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS EMPLOYING PHOTOCONDUCTIVE CHARGE TRANSFER COMPLEXES. OCT. 29, 1968.

3,408,190.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS EMPLOYING PHOTOCONDUCTIVE CHARGE TRANSFER COMPLEXES. OCT. 29, 1968. CAN. 0850019, GER. 1302772, GRB. 1182172.

3,536,482.—ELECTROPHOTOGRPHC IMG SYS INCL A HALOGEN TREATMENT STOP FOR MAKING BCKGRND AREAS TRANSPARENT. OCT. 27, 1970.

3,607,258.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS. SEPT. 21, 1971. CAN. 0871634, GRB. 1174171.

3,865,798.—PHOTOACTIVE POLYMERS INDUCED EXO-CYCLIC QUARTET CONCEPT. FEB. 11, 1975. AUS. 0462805, BEL. 0790689, FRA. 7237458, GRB. 1411998, ITL. 0969902, MEX. 0133728, SPN. 0407984, STZ. 0028515.

3,879,201.—PERSISTENT PHOTOCONDUCTIVE COMPOSITIONS. APR. 22, 1975.

3,899,328.—ACTIVE MATRIX AND INTRINSIC PHOTOCONDUCTIVE POLYMER OF A LINEAR POLYSILOXANE. AUG. 12, 1975.

3,923,762.—PROCESS FOR PREPARATION OF 2-ANTHRYL AND SUBSTITUTED 2-ANTHRYL FUNCTIONAL MONOMERS AND P. DEC. 2, 1975. BEL. 0822305, STZ. 0032598.

3,957,725.—AN ACTIVE MATRIX AND INTRINSIC PHOTOCONDUCTIVE POLYMER. MAY 18, 1976.

Class 1A 2C

3,451,811.—ELECTROPHOTOGRAPHIC IMAGING PROCESSES USING ELECTRICALLY PHOTOSENSITIVE PHOTOCHROMIC MATERIALS. JUNE 24, 1969. CAN. 0828692, JAP. 0573734.

3,660,086.—ELCTRPHTGRPC PLATE AND PROCS EMPLYNG INORGNC PHOTCNDCTV MATRL W/PHOTOCHROMIC SENSITIVE AGENT. MAY 2, 1972.

3,961,948.—PHOTOCHROMIC IMAGING METHOD. JUNE 8, 1976.

Class 1A 2D

3,518,081.—IMAGE FORMATION AND DEVELOPMENT - REISSUED D 857R. JUNE 30, 1970. CAN. 0801270, GRB. 1085573.

Class 1A 3

3,041,166.—XEROGRAPHIC PLATE AND METHOD. JUNE 26, 1962. CAN. 0617821, GRB. 0936649.

3,312,547.—XEROGRAPHIC PLATE AND PROCESSES OF MAKING AND USING SAME. APR. 4, 1967.

3,341,326.—DARK DECAY CONTROLLED XEROGRAPHY. SEPT. 12, 1967. AUS. 0285843, CAN. 0729829, FRA. 1377592, GRB. 1029199, ITL. 0706101.

3,352,669.—PHOTOCONDUCTIVE MEMBER AND PROCESSES OF PREPARING AND USING SAME. NOV. 14, 1967. AUS. 0405164, CAN. 0834670, FRA. 1422625, GER. 1497194, GRB. 1052970, HOL. 0137891, ITL. 0749420, JAP. 0501912.

3,393,070.—XEROGRAPHIC PLATE WITH ELECTRIC FIELD REGULATING LAYER. JULY 16, 1968. CAN. 0871308, GER. 1490987, GRB. 1141452, JAP. 0764435, MEX. 0105660.

3,508,918.—XEROGRAPHIC PLATE CONTAINING ALUMINUM SELENIDE BARRIER LAYER. APR. 28, 1970. CAN. 0872175.

3,573,906.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS. APR. 6, 1971. ARG. 0177890, AUS. 0441534, BEL. 0725173, BRA. 0088092, CAN. 0906801, CZC. 0157053, FRA. 1594981, GRB. 1217726, ITL. 0852743, SPN. 0379204, SWD. 0335063, USR. 0448658, VZL. 0029780.

3,723,110.—ELECTROPHOTOGRAPHIC PROCESS. MAR. 27, 1973.

3,765,757.—TRANSPORT ARRANGEMENT FOR THIN SHEET MATERIAL. OCT. 16, 1973. BEL. 0793551, GRB. 1419978, ITL. 0972846, SPN. 0410107.

3,867,027.—TRANSPORT ARRANGEMENT FOR THIN SHEET MATERIAL. FEB. 18, 1975. BEL. 0793551, GRB. 1419978, ITL. 0972846, SPN. 0410107.

3,907,650.—PHOTOSENSITIVE BINDER LAYER FOR XEROGRAPHY. SEPT. 23, 1975.

3,914,126.—NICKEL OXIDE INTERLAYERS FOR PHOTOCONDUCTIVE ELEMENTS. OCT. 21, 1975.

Class 1A 4

2,886,434.—PROTECTED PHOTOCONDUCTIVE ELEMENT AND METHOD OF MAKING SAME - HORIZONS. MAY 12, 1959. CAN. 0621931.

3,251,686.—XEROGRAPHIC PROCESS. MAY 17, 1966. FRA. 1292831, GER. 1243979, GRB. 0996972, JAP. 0416023.

3,256,089.—MASKED PLATE XEROGRAPHY. JUNE 14, 1966.

3,288,604.—IMAGING METHOD USING AN ELEMENT HAVING A GLASS OVERCOATING. NOV. 29, 1966. CAN. 0815735.

3,397,982.—XIC PLATE W/INORGANIC GLASS BINDER HAVING OVERCOATING CONSISTING ESSENTIALLY OF ALUMINUM OXIDE. AUG. 20, 1968. ARG. 0150690, AUS. 0407349, BEL. 0674140, CAN. 0866142, FRA. 1460232, GER. 1497230, GRB. 1129674, ITL. 0822914, JAP. 0531894, MEX. 0085270, SWD. 0319976.

3,434,832.—XEROGRAPHIC PLATE COMPRISING A PROTECTIVE COATING OF A RESIN MIXED WITH A METALLIC STEARATE. MAR. 25, 1969. CAN. 0835883, FRA. 1454672, GER. 1497223, GRB. 1128156, ITL. 0772535, JAP. 0545757, MEX. 0085603.

3,488,189.—ELECTROPHOTOGRAPHIC RECORDING MEMBER HAVING SOLID CRYSTALLINE PLASTICIZR AVAILBL AT IMGNG SURFA. JAN. 6, 1970. CAN. 0866700, FRA. 1506810, GRB. 1183205, ITL. 0788976, JAP. 0570734, MEX. 0108241.

3,607,258.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS. SEPT. 21, 1971. CAN. 0871634, GRB. 1174171.

3,816,115.—METHOD FOR FORMING A PLURALITY OF ELECTROSTATIC LATENT IMAGES ON AN ELECTROPHOTOGRAPHIC PLATE. JUNE 11, 1974.

3,860,421.—N-ALKYL MORPHOLINE TREATMENT OF A SELENIUM-CONTAINING PHOTOCONDUCTIVE LAYER. JAN. 14, 1975.

3,865,798.—PHOTOACTIVE POLYMERS INDUCED EXO-CYCLIC QUARTET CONCEPT. FEB. 11, 1975. AUS. 0462805, BEL. 0790689, FRA. 7237458, GRB. 1411998, ITL. 0969902, MEX. 0133728, SPN. 0407984, STZ. 0028515.

3,884,690.—POLYESTER PHOTOCONDUCTORS AND MATRIX MATERIALS. MAY 20, 1975.

3,896,184.—POLYMERS OF BENZANTHRACENE AS ACTIVE MATRIX MATERIALS. JULY 22, 1975.

3,899,328.—ACTIVE MATRIX AND INTRINSIC PHOTOCONDUCTIVE POLYMER OF A LINEAR POLYSILOXANE. AUG. 12, 1975.

3,957,725.—AN ACTIVE MATRIX AND INTRINSIC PHOTOCONDUCTIVE POLYMER. MAY 18, 1976.

Class 1A 5

3,411,903.—XEROGRAPHIC METHOD AND PLATE COMPRISING PHOTOCONDUCTIVE INSULATING FIBERS. NOV. 19, 1968. ARG. 0149620, ATR. 0270379, AUS. 0410718, BEL. 0672668, BRA. 0084119, CAN. 0834669, CHL. 0023648, CLB. 0014943, DNK. 0120577, EGR. 0055545, FRA. 1464792, GER. 1497224, GRB. 1084024, GRK. 0031509, IND. 0102560, ISR. 0024632, ITL. 0734376, JAP. 0724233, LXB. 0049849, MEX. 0098487, NOR. 0122817, NZL. 0143432, PLO. 0067959, PLP. 0004547, PNM. 0001533, PRU. 0008384, PTG. 0044879, SAF. 0656280, SPN. 0319795, STZ. 0458076, SWD. 0308250, THL. 1084024, TIW. 0003735, URG. 0006624, VZL. 0023996.

Class 1A 6

3,003,869.—XEROGRAPHIC PLATE OF HIGH QUANTUM EFFICIENCY. OCT. 10, 1961.

3,288,602.—XEROGRAPHIC PLATE AND METHOD. NOV. 29, 1966. CAN. 0795978, GER. 1237902, GRB. 1029181, ITL. 0690835, JAP. 0578399.

3,621,248.—METHOD USING XERORADIOGRAPHIC PLATE INSENSITIVE TO VISIBLE LIGHT. NOV. 16, 1971.

3,684,500.—METHOD OF FORMING PERMANENT ELECTROSTATIC IMAGE WITH TWO-LAYERED PHOTORECEPTOR. AUG. 15, 1972.

3,843,407.—BLADE CLEANING WITH REVERSE MOVEMENT. OCT. 22, 1974.
3,907,650.—PHOTOSENSITIVE BINDER LAYER FOR XEROGRAPHY. SEPT. 23, 1975.
3,914,126.—NICKEL OXIDE INTERLAYERS FOR PHOTOCONDUCTIVE ELEMENTS. OCT. 21, 1975.

Class 1B

3,730,453.—EARLY END-OF-TAPE DETECTION. MAY 1, 1973. CAN. 0939052, GRB. 1354581.
3,889,292.—APPARATUS FOR MAKING MULTIPLE ALPHANURMIC COPIES OF A BINARY CODED MESSAGE. JUNE 10, 1975. CAN. 0986572.

Class 1B 1

2,917,385.—REFLEX XEROGRAPHY. DEC. 15, 1959. CAN. 0577137.
3,244,546.—ELECTROSTATIC IMAGE REPRODUCTION. APR. 5, 1966. CAN. 0847532, GRB. 1040371, JAP. 0477223.
3,484,162.—ELECTROVISCOUS RECORDING. DEC. 16, 1969.
3,518,698.—IMAGING SYSTEM. JUNE 30, 1970. CAN. 0905481, FRA. 1542838, GRB. 1200804, JAP. 0604154, MEX. 0099911.
3,561,957.—ELECTROPHOTOGRAPHIC PROCESS USING A HIGH INTENSITY ELECTROMAGNETIC RADIATION SOURCE. FEB. 9, 1971. CAN. 0914266, GRB. 1207361.
3,631,507.—METHOD OF REDISTRIBUTING CHARGE ON A DIELECTRIC MEDIUM. DEC. 28, 1971.
3,677,750.—PHOTOELECTROSOLOGRAPHIC IMAGING. JULY 18, 1972. GRB. 1326934.
3,686,678.—DUAL MODE ELECTROSTATIC PRINTING. AUG. 22, 1972. BEL. 0747125, CAN. 0952574, FRA. 7007650, GRB. 1297996, JAP. 0753534.
3,719,481.—ELECTROSTATOGRAPHIC IMAGING PROCESS. MAR. 6, 1973.
3,729,334.—IMAGING PROCESS. APR. 24, 1973.
3,854,942.—TRANSPARENCY FOR MULTI-COLOR ELECTROSTATIC COPYING. DEC. 17, 1974.

Class 1B 2

2,817,277.—ELECTROPHOTOGRAPHIC CAMERA. DEC. 24, 1957.
3,057,719.—PROCESS FOR FORMING ELECTROSTATIC IMAGES. OCT. 9, 1962. GRB. 0947039.
3,084,061.—METHOD FOR FORMATION OF ELECTROSTATIC IMAGE. APR. 2, 1963. CAN. 0607290.
3,196,013.—XEROGRAPHIC INDUCTION RECORDING WITH MECHANICALLY DEFORMABLE IMAGEFORMATION IN A DEFORMABLE LAY. JULY 20, 1965. CAN. 0778520, FRA. 1360084, GER. 1253581, ITL. 0711488, JAP. 0649672.
3,321,308.—XEROGRAPHIC INDUCTION RECORDING. MAY 23, 1967. CAN. 0778521, FRA. 1393821, GRB. 1049903, ITL. 0801906, JAP. 0537660.
3,551,146.—INDUCTION IMAGING SYSTEM. DEC. 29, 1970.
3,703,376.—INDUCTION SYSTEM. NOV. 21, 1972. ARG. 0190247, MEX. 0123032.
3,738,855.—INDUCTION IMAGING SYSTEM. JUNE 12, 1973.
3,778,841.—INDUCTION IMAGING SYSTEM. DEC. 11, 1973. ARG. 0190247, MEX. 0123032.

Class 1B 3

2,576,047.—METHOD AND APPARATUS FOR PRINTING ELECTRICALLY. NOV. 20, 1951. AUS. 0150449, CAN. 0485073, GER. 0919891, GRB. 0675398, STZ. 0286141, SWD. 0163889.
3,043,217.—ELECTROSTATIC PRINTING APPARATUS. JULY 10, 1962.
3,145,655.—EQUIPOTENTIAL XEROPRINTING MEMBER AND PROCESS OF PRINTING THERE WITH. AUG. 25, 1964. CAN. 0784647, GER. 1287095, GRB. 0958964, JAP. 0591209.
3,160,091.—HIGH SPEED XEROPRINTER AND METHOD THEREFOR. DEC. 8, 1964. GRB. 0978349.
3,318,698.—XEROPRINTING REPRODUCTION. MAY 9, 1967. CAN. 0790236, FRA. 1394421, GRB. 1055323, ITL. 0801547, JAP. 0504497.
3,515,584.—XEROPRINTING MASTER. JUNE 2, 1970. CAN. 0882600, GRB. 1204246, JAP. 0659019.
3,547,627.—LITHOGRPHC PRINTG MASTER AND METHOD EMPLOYING A CRYSTALLINE PHOTOCONDUCTIVE IMAGING LAYER. DEC. 15, 1970.
3,574,614.—PROCESS OF PREPARING MULTIPLE COPIES FROM A XEROPRINTING MASTER. APR. 13, 1971. ATR. 0305769, AUS. 0448396, BEL. 0743660, CAN. 0882599, FRA. 6944513, GRB. 1209060, ITL. 0879118, JAP. 0713808.

Class 1B 4A

2,825,814.—XEROGRAPHIC IMAGE FORMATION. MAR. 4, 1958. ARG. 0105238, AUS. 0203970, BRA. 0052412, CAN. 0564673, SAF. 0021814, SWD. 0200906.
2,937,943.—TRANSFER OF ELECTROSTATIC CHARGE PATTERN. MAY 24, 1960. CAN. 0680751.
2,982,647.—ELECTROSTATIC IMAGE REPRODUCTION. MAY 2, 1961.
3,015,304.—ELECTROSTATIC IMAGE REPRODUCTION. JAN. 2, 1962. CAN. 0713395.
3,653,891.—FORMS OVERLAY TECHNIQUE USING TESI. APR. 4, 1972. ARG. 0184314, AUS. 0459354, BEL. 0761030, CAN. 0946912, FRA. 7047635, GRB. 1339714, ITL. 0913996, MEX. 0119467.

Class 1B 4B

2,919,967.—HIGH-SPEED ELECTROSTATIC ALPHANUMERICAL PRINTER. JAN. 5, 1960. CAN. 0682116, GER. 1199033, GRB. 0889663.
2,978,968.—RECORDING APPARATUS AND METHOD. APR. 11, 1961.
3,023,731.—ELECTROSTATIC ALPHANUMERICAL PRINTER WITH IMAGE TRANSFER MECHANISM. MAR. 6, 1962. CAN. 0622350, GRB. 0889664.
3,045,587.—ELECTROSTATIC PRINTING APPARATUS FOR FORMING MULTIPLE COPIES. JULY 24, 1962. CAN. 0682115, GRB. 0888867.
3,045,644.—TWO-COLOR ELECTROSTATIC PRINTING APPARATUS. JULY 24, 1962. CAN. 0634187, GRB. 0886766.
3,060,432.—ELECTROSTATIC RECORDING OF INFORMATION. OCT. 23, 1962.
3,064,259.—ELECTROSTATIC RECORDING OF INFORMATION. NOV. 13, 1962. CAN. 0736628.
3,068,481.—PROCESS AND APPARATUS FOR TESI-PRINTING. DEC. 11, 1962. CAN. 0709093, GRB. 0987234, JAP. 0446814.
3,091,762.—ELECTROSTATIC APPARATUS FOR MEASURING AND RECORDING TIME INTERVALS. MAY 28, 1963. CAN. 0620988, FRA. 1202341, GER. 1252149, GRB. 0880725, ITL. 0585388.
3,182,591.—IMAGE FORMING APPARATUS AND METHOD. MAY 11, 1965.
3,208,076.—ELECTROSTATIC PRINTER. SEPT. 21, 1965. GRB. 0999260.
3,217,330.—ELECTROSTATIC PRINTING UTILIZING PRINT-THROUGH RECORDING. NOV. 9, 1965. CAN. 0773752, GRB. 1001152.
3,234,359.—RECORD CARD SCANNING APPARATUS. FEB. 8, 1966.
3,234,904.—DEVICE FOR TESIPRINTING. FEB. 15, 1966. AUS. 0277492, CAN. 0804878, FRA. 1367728, GRB. 1024635, ITL. 0697883.
3,257,222.—ELECTROSTATIC RECORDING METHOD AND APPARATUS USING SHAPED ELECTRODES. JUNE 21, 1966. CAN. 0736231, GRB. 1027438, JAP. 0451019.
3,289,209.—ELECTROSTATIC MATRIX PRINTER. NOV. 29, 1966. CAN. 0707049, FRA. 1357858, GER. 1447873, GRB. 1018513, ITL. 0694321, JAP. 0440456.
3,342,126.—MULTIPLE ELECTROGRAPHIC PRINTER HAVING PLURAL UNITS CONNECTED TO COMMON DRIVE MEANS. SEPT. 19, 1967. CAN. 0825341, GRB. 1182685, JAP. 0648073.
3,348,232.—ASYNCHRONOUS PAGE-AT-A-TIME PRINTER. OCT. 17, 1967. CAN. 0709971, GRB. 1025487, JAP. 0462803.
3,358,592.—ELECTROGRAPHIC PRINTING. DEC. 19, 1967. CAN. 0896701, FRA. 1514749, GER. 1512401, GRB. 1182686, ITL. 0793834, MEX. 0098070.
3,430,254.—TESI PRINTING WITH FLEXIBLE ELECTRODE ON ENDLESS BELT. FEB. 25, 1969.
3,438,052.—AIR-SUPPORTED HOUSING CONTAINING TESI PRINTING DRUM. APR. 8, 1969. CAN. 0827330, GRB. 1149349.
3,495,269.—ELECTROGRAPHIC RECORDG METH AND APPRTS W/INERT GASEOUS DISCHARGE IONIZATION AND ACCELERATION GAPS. FEB. 10, 1970. ARG. 0174765, ATR. 0309208, AUS. 0413341, BEL. 0707986, CAN. 0865837, CZC. 0164808, FRA. 1551296, GRB. 1205790, ITL. 0819587, JAP. 0587936, MEX. 0103538, SPN. 0348328, SWD. 0346867, USR. 0291520.

3,599,225.—ELECTROSTATIC RECORDING APPARATUS - AIR GAP APERTURE BELT COMMUNICATIONS PRINTER. AUG. 10, 1971. CAN. 0882319, GRB. 1226436, JAP. 0675796.

3,644,930.—MULTI-STYLUS RECORDER. FEB. 22, 1972. ARG. 0181835, AUS. 0457379, BEL. 0751150, CAN. 0944812, CHL. 0025752, FRA. 7019463, GRB. 1297110, ITL. 0893693, MEX. 0119071, SPN. 0380273, SWD. 0368289, TIW. 0005822, VZL. 0027516.

3,673,600.—ELECTROGRAPHIC RECORDING METHOD AND APPARATUS. JUNE 27, 1972. CAN. 0947361, GRB. 1318605.

3,673,603.—RECIPROCATING CARRIAGE FOR ELECTROGRAPHIC PRINTING. JUNE 27, 1972. CAN. 0937629, GRB. 1346647.

3,686,676.—DUAL MODE ELECTROGRAPHIC RECORDER. AUG. 22, 1972. CAN. 0954293.

3,686,679.—MULTI-STYLUS RECORDING ASSEMBLY. AUG. 22, 1972.

3,714,665.—ELECTROSTATIC RECORDING WITH IMPROVED ELECTROSTATIC CHARGE RETENTION. JAN. 30, 1973.

3,717,880.—DUAL MODE ELECTROGRAPHIC RECORDING. FEB. 20, 1973. BEL. 0774564, CAN. 0948271, FRA. 7139638, GRB. 1366129, ITL. 0937674.

3,766,850.—DEVELOPING MEANS FOR ELECTROSTATIC PRINTING APPARATUS. OCT. 23, 1973. CAN. 0972551, FRA. 7246855, GRB. 1415325, ITL. 0973310, SWD. 7216975.

3,771,184.—PRINTING APPARATUS. NOV. 13, 1973. CAN. 0973704, FRA. 7246858, GRB. 1415200, ITL. 0973321, SWD. 7216973.

3,795,010.—WRITING APPARATUS AND METHOD OF MANUFACTURE. FEB. 26, 1974.

3,806,238.—FORMS OVERLAY TECHNIQUE USING TEST. APR. 23, 1974.

3,811,766.—DEVELOPING APPARATUS. MAY 21, 1974. ARG. 0183333, AUS. 0446187, BEL. 0747127, CAN. 0879412, EGR. 0084803, FRA. 7008249, GRB. 1296417, ITL. 0898245, JAP. 0770134, MEX. 0112930, SPN. 0377301, STZ. 0521614, SWD. 0361749, TIW. 0006826, USR. 0352484.

3,875,578.—ENVELOPED STYLUS RECORDER. APR. 1, 1975. CAN. 0947360, FRA. 7008242, GRB. 1296416.

3,971,042.—WRITING APPARATUS AND METHOD OF MANUFACTURE. JULY 20, 1976.

Class 1B 3

3,967,818.—DUPLICATING SYSTEM. JULY 6, 1976.

Class 1C 1

3,236,165.—XEROGRAPHIC REPRODUCING APPARATUS. FEB. 22, 1966. CAN. 0771829, JAP. 0547196.

3,343,142.—XEROGRAPHIC CODING AND INFORMATION STORAGE ON A SPECULAR BUSINESS MACHINE CARD. SEPT. 19, 1967. CAN. 0844786, GRB. 1047261, JAP. 0701182.

3,437,020.—MICROFILM TITLING APPARATUS. APR. 8, 1969. CAN. 0837780, GRB. 1191019, JAP. 0572188.

3,499,374.—XEROGRAPHIC PRINTER. MAR. 10, 1970. AUS. 0415164, BEL. 0677146, CAN. 0846424, FRA. 1470069, GRB. 1135603, ITL. 0762255, MEX. 0091183, SWD. 0327142.

3,521,950.—XEROGRAPHIC REPRODUCING APPARATUS. JULY 28, 1970. ARG. 0184148, ATR. 0317675, AUS. 0441739, BEL. 0713876, CAN. 0877511, CHL. 0024535, DNK. 0129304, FRA. 1558225, GRB. 1231622, GRK. 0037839, IND. 0124668, ISR. 0029824, ITL. 0831700, JAM. 0001853, JAP. 0774498, LXB. 0055912, MEX. 0102085, NOR. 0131313, NZL. 0159801, PRU. 0009366, PTG. 0049474, SAF. 6872518, SPN. 0352885, STZ. 0505015, SWD. 7012263, UAR. 0008668, URG. 0009239, VZL. 0025077.

3,689,143.—REPRODUCING MACHINE. SEPT. 5, 1972.

Class 1C 2

2,816,493.—ELECTROPHOTOGRAPHIC MICROFILM ENLARGER. DEC. 17, 1957.

3,094,036.—IMAGE SELECTOR APPARATUS. JUNE 18, 1963. CAN. 0683832.

3,236,165.—XEROGRAPHIC REPRODUCING APPARATUS. FEB. 22, 1966. CAN. 0771829, JAP. 0547196.

3,379,106.—XEROGRAPHIC REPRODUCTION APPARATUS. APR. 23, 1968. ATR. 0300567, AUS. 0416116, BEL. 0674602, CAN. 0821718, DNK. 0117045, FRA. 1475712, GRB. 1135742, ITL. 0750206, MEX. 0095580, SPN. 0321099, STZ. 0509924, SWD. 6912065.

3,480,360.—XEROGRAPHIC COPYING APPARATUS. NOV. 25, 1969. ARG. 0180571, ATR. 0301344, AUS. 0310556, BEL. 0704978, CAN. 0870794, CHL. 0023569, FRA. 1540839, GRB. 1206964, GRK. 0035147, HUN. 0158496, IND. 0112715, ITL. 0827017, LXB. 0054635, MEX. 0102269, NZL. 0156632, PRU. 0009341, PTG. 0048460, SAF. 0676065, SPN. 0345998, STZ. 0487439, SWD. 0337743, URG. 0008847, VZL. 0023675.

3,592,539.—RECORDING APPARATUS. JULY 13, 1971. CAN. 0917230.

3,689,143.—REPRODUCING MACHINE. SEPT. 5, 1972.

Class 1C 3

3,130,411.—ELECTRONIC RECORDER. APR. 21, 1964. CAN. 0729326.

3,212,888.—METHOD FOR DEVELOPING LATENT ELECTROSTATIC CHARGE HALFTONE IMAGES. OCT. 19, 1965. GER. 1284302, GRB. 1017683, JAP. 0470423.

3,281,857.—XEROGRAPHIC TRANSFER PLATEN. OCT. 25, 1966. CAN. 0733683, GRB. 1025199.

3,535,036.—APPARATUS FOR FORMING HALF-TONE LINE SCREEN WITH A LENS. OCT. 20, 1970. CAN. 0909309, GRB. 1253887.

3,698,893.—METHODS OF ORGANIZED THERMOPLASTIC XEROGRAPHY AND PHOTORECEPTOR STRUCTURE THEREFOR. OCT. 17, 1972.

3,873,310.—METHOD OF CONTROLLING THE BRIGHTNESS ACCEPTANCE RANGE AND TONAL CONTRAST OF XEROGRAPHIC PLATE. MAR. 25, 1975. GRB. 1414951.

3,905,822.—COMPOUND SCREEN FOR OBJECT SCREENING. SEPT. 16, 1975.

3,912,510.—ELECTROPHOTOGRAPHIC PROCESS EMPLOYING A COMPOUND DOCUMENT SCREEN. OCT. 14, 1975.

Class 1C 4

3,196,009.—ELECTROSTATIC IMAGE LIQUID DEFORMATION DEVELOPMENT. JULY 20, 1965. ATR. 0267320, AUS. 0273895, BEL. 0631984, CAN. 0768329, DNK. 0129676, FRA. 1408156, GER. 1497058, GRB. 1043981, HOL. 0134043, ISR. 0019144, ITL. 0695213, JAP. 0620918, LXB. 0043704, MEX. 0080571, NOR. 0123260, SAF. 0001947, STZ. 0448745, SWD. 0315502.

3,196,010.—ELECTROPHOTOGRAPHIC PROCESS FOR FORMATION OF DEFORMATION IMAGES IN DEFORMABLE INTERFERENCE FILM. JULY 20, 1965. CAN. 0790232, FRA. 1364100, GRB. 1036738, ITL. 0695214, JAP. 0510166.

3,196,012.—HALF-TONE XEROGRAPHY WITH THERMOPLASTIC DEFORMATION OF THE IMAGE. JULY 20, 1965. CAN. 0760623, FRA. 1359565, GER. 1497060, GRB. 1040836, ITL. 0697483, JAP. 0478444.

3,196,013.—XEROGRAPHIC INDUCTION RECORDING WITH MECHANICALLY DEFORMABLE IMAGE FORMATION IN A DEFORMABLE LAY. JULY 20, 1965. CAN. 0778520, FRA. 1360084, GER. 1253581, ITL. 0711488, JAP. 0649672.

3,307,941.—PLASTIC DEFORMATION IMAGING FILM AND PROCESS. MAR. 7, 1967. CAN. 0801262.

3,419,885.—IMAGE DEVELOPMENT OF THERMOPLASTIC LAYERS. DEC. 31, 1968. CAN. 0785985, GRB. 1117644, JAP. 0537663.

3,436,216.—IMAGE STORAGE COMPRISING A THERMOPLASTIC DEFORMATION PATTERN. APR. 1, 1969. CAN. 0807326, FRA. 1488094, GRB. 1160731, ITL. 0774940.

3,445,227.—ELECTROPHOTOGRAPHIC IMAGING PROCESSES EMPLOYING 2,4 DIAMINOTRIAZINES AS ELCTRCLY PHOTOSNSTV PRT. MAY 20, 1969. BEL. 0743891, CAN. 0852681, GER. 1522687, GRB. 1146019, JAP. 0617789.

3,448,028.—N-SBSTUD-8,13-DIOXODINAPHTHO-2-1-B,2,3-D-FURAN-6-CARBOXAMIDES AS ELCTLY PTOSNSTV MTLS IN ELCPHG. JUNE 3, 1969.

3,448,029.—ELECTROPHORETIC IMAGING PROCESS USING 8,13-DIOXODINAPTHO-2,1-B,2,3-D-FURAN-6-CARBOXAMIDE PIGMEN. JUNE 3, 1969.

3,448,030.—ELECTRICALLY PHOTOSENSITIVE PART. USEFUL IN PHOTOELECTROPHORETIC AND XEROGRAPHIC IMAGING PROCESSE. JUNE 3, 1969. BEL. 0743893, CAN. 0943830, GRB. 1155554, JAP. 0686735.

3,698,892.—METHODS OF THERMOPLASTIC XEROGRAPHY AND APPARATUS THEREFOR. OCT. 17, 1972. CAN. 0949117, GRB. 1343191.

3,698,893.—METHODS OF ORGANIZED THERMOPLASTIC XEROGRAPHY AND PHOTORECEPTOR STRUCTURE THEREFOR. OCT. 17, 1972.

3,716,359.—CYCLIC RECORDING SYSTEM BY THE USE OF AN ELASTOMER IN AN ELECTRIC FIELD. FEB. 13, 1973. ARG. 0196734, AUS. 0461213, BEL. 0777320, CAN. 0953990, FRA. 7147891, GRB. 1380057, ITL. 0944392, MEX. 0131400, SPN. 0398306.

3,719,483.—METHODS OF ORGANIZED THERMOPLASTIC XEROGRAPHY AND PHOTORECEPTOR STRUCTURE THEREFOR. MAR. 6, 1973.

3,730,621.—CONTROL OF ELECTROSTATIC DEFORMATION OF THERMOPLASTIC FILM. MAY 1, 1973.

3,795,514.—DEFORMATION IMAGING METHOD. MAR. 5, 1974.

3,842,406.—CYCLIC RECORDING SYSTEM BY THE USE OF AN ELASTOMER IN AN ELECTRIC FIELD. OCT. 15, 1974. ARG. 0196734, AUS. 0461213, BEL. 0777320, CAN. 0953990, FRA. 7147891, GRB. 1380057, ITL. 0944392, MEX. 0131400, SPN. 0398306.

3,858,973.—METHODS OF THERMOPLASTIC XEROGRAPHY AND APPARATUS THEREFOR. JAN. 7, 1975. CAN. 0949117, GRB. 1343191.

3,888,591.—IMAGE SUBTRACTION APPARATUS. JUNE 10, 1975.

3,932,025.—IMAGING SYSTEM. JAN. 13, 1976.

3,944,358.—COLOR IMAGE REPRODUCTION SYSTEMS. MAR. 16, 1976.

3,961,950.—IMAGING SYSTEM. JUNE 8, 1976.

Class 1C 4A

3,196,008.—ELECTROPC PRCS FOR FRMTN OF FRST LIKE DEFRMTN IMGS IN MECHANICALLY DEFRMBL PHOTOCONDUCTIVE LAYER. JULY 20, 1965. CAN. 0844221.

3,196,011.—ELECTROSTATIC FROSTING. JULY 20, 1965. ARG. 0150575, ATR. 0256625, AUS. 0275848, BEL. 0631983, BRA. 0082433, CAN. 0918226, CHL. 0019655, EIR. 0027268, FIN. 0044982, FRA. 1364101, GER. 1295371, GRB. 1039881, GRK. 0026981, HOL. 0140635, IND. 0087685, ISR. 0019143, ITL. 0695215, LXR. 0043693, MEX. 0102124, NOR. 0118346, NZL. 0134799, PAK. 0114430, PLP. 0003269, PTG. 0040894, SAF. 0001948, SPN. 0292129, STZ. 0425467, SWD. 0315201, TRK. 0011937, UAR. 0004997, VTM. 0000992, VZL. 0014488.

3,213,429.—HIGH SPEED INFORMATION RECORDER. OCT. 19, 1965.

3,258,336.—STRIPPABLE LAYER FROST PRINTING. JUNE 28, 1966. CAN. 0815184.

3,322,034.—FROST COLOR DISPLAY. MAY 30, 1967.

3,329,500.—ELECTROSTATIC FROSTING. JULY 4, 1967.

3,482,969.—FIXING OF DEFORMATION IMAGES. DEC. 9, 1969. CAN. 0801883, FRA. 1399003, GRB. 1061235, ITL. 0726200, SWD. 0315806.

3,485,623.—CONTINUOUS TONE THERMOPLASTIC PHOTOGRAPHY. DEC. 23, 1969. CAN. 0810834, GRB. 1181093, JAP. 0565795.

3,526,879.—INTERNAL FROST RECORDING APPARATUS USING A DEFORMABLE PHOTOCONDUCTOR. SEPT. 1, 1970.

3,542,545.—FROST OR RELIEF WRNKLNG OF AN IMGNG ARTCL COMPRSNG AN ELCTRCLY PHOTSNSTV LAYER AND DEFORMABLE LAY. NOV. 24, 1970. ARG. 0174588, ATR. 0300563, AUS. 0424162, BEL. 0726280, CAN. 0928764, CHL. 0025764, DNK. 0126400, FRA. 1604336, GER. 1817226, GRB. 1234600, GUA. 0002531, ITL. 0864015, JAP. 0693385, LXB. 0057697, MEX. 0107799, NZL. 0154931, PNM. 0001803, PRU. 0010480, SAF. 0688517, SPN. 0362039, STZ. 0518578, SWD. 0354132, URG. 0009690.

3,560,205.—METHOD OF FORMING A PHASE MODULATING HOLOGRAM ON A DEFORMABLE THERMOPLASTIC. FEB. 2, 1971. CAN. 0949793, GRB. 1162853.

3,560,206.—PRODUCTION OF LATENT PERODIC MEMORY PATTERNS IN FROSTABLE FILMS. FEB. 2, 1971.

3,561,958.—INDUCING FROST DEFORMATION IMAGING BY ELECTROLYTIC DEPOSITION. FEB. 9, 1971.

3,672,883.—CRYSTALLINE POLYMERS FOR FROST. JUNE 27, 1972.

3,672,886.—NOVOLAR RESINS IN DEFORMATION IMAGING. JUNE 27, 1972.

3,764,311.—IMAGING SYSTEM. OCT. 9, 1973.

3,819,369.—SURFACE DEFORMABLE IMAGING MEMBER OF IMPROVED DARK DECAY CHARACTERISTICS. JUNE 25, 1974.

3,926,626.—CIRCULATION IMAGING METHOD. DEC. 16, 1975.

Class 1C 4B

3,238,041.—RELIEF IMAGING OF PHOTORESPONSIVE MEMBER AND PRODUCT. MAR. 1, 1966. CAN. 0850841, GRB. 1043983, MEX. 0080410.

3,321,308.—XEROGRAPHIC INDUCTION RECORDING. MAY 23, 1967. CAN. 0778521, FRA. 1393821, GRB. 1049903, ITL. 0801906, JAP. 0537660.

3,542,545.—FROST OR RELIEF WRNKLNG OF AN IMGNG ARTCL COMPRSNG AN ELCTRCLY PHOTSNSTV LAYER AND DEFORMABLE LAY. NOV. 24, 1970. ARG. 0174588, ATR. 0300563, AUS. 0424162, BEL. 0726280, CAN. 0928764, CHL. 0025764, DNK. 0126400, FRA. 1604336, GER. 1817226, GRB. 1234600, GUA. 0002531, ITL. 0864015, JAP. 0693385, LXB. 0057697, MEX. 0107799, NZL. 0154931, PNM. 0001803, PRU. 0010480, SAF. 0688517, SPN. 0362039, STZ. 0518578, SWD. 0354132, URG. 0009690.

3,615,388.—DEFORMATION IMAGING PROCESS AND ELEMENT. OCT. 26, 1971. CAN. 0941877, MEX. 0101539.

3,926,626.—CIRCULATION IMAGING METHOD. DEC. 16, 1975.

Class 1C 5

2,817,765.—XEROGRAPHIC METHOD. DEC. 24, 1957.

2,968,553.—XEROGRAPHIC APPARATUS AND METHOD. JAN. 17, 1961. CAN. 0624329.

3,519,818.—METHOD OF PREPARING A NEGATIVE XEROGRAPHIC REPRODUCTION FROM A POSITIVE LINE COPY IMAGE. JULY 7, 1970. CAN. 0829037, GRB. 1191159, JAP. 0589516.

Class 1C 4

3,946,433.—PHASE IMAGE SCANNING METHOD. MAR. 23, 1976. BEL. 0835551.

Class 1C 4A

3,923,504.—MIGRATION IMAGING MEMBER AND METHOD. DEC. 2, 1975.

Class 1C 4B

3,923,504.—MIGRATION IMAGING MEMBER AND METHOD. DEC. 2, 1975.

Class 1D

3,318,212.—DUPLEX XEROGRAPHIC REPRODUCTION. MAY 9, 1967.

3,506,347.—DUPLEX XEROGRAPHIC REPRODUCTION APPARATUS. APR. 14, 1970.

3,536,398.—REPRODUCTION APPARATUS. OCT. 27, 1970. AUS. 0442047, BEL. 0737274, CAN. 0899443, EGR. 0091200, FRA. 6927759, GRB. 1246226, ITL. 0883645, SPN. 0370416, STZ. 0500517, SWD. 0356144, TIW. 0005358, USR. 0359871.

3,580,670.—APPARATUS FOR DUPLEXING. MAY 25, 1971. CAN. 0929581.

3,615,129.—DUPLEXING XEROGRAPHIC REPRODUCING MACHINE WITH COPY SHEET REVERSING STATION. OCT. 26, 1971. ARG. 0172601, AUS. 0432830, BEL. 0737341, CAN. 0909853, CZC. 0158650, EGR. 0083299, FRA. 6927784, GRB. 1256767, ITL. 0883644, JAP. 0774495, MEX. 0108784, SPN. 0370415, STZ. 0500518, SWD. 0356143, TIW. 0006822, USR. 0371736, VZL. 0032923.

3,671,118.—APPARATUS FOR CREATING DUPLEX REPRODUCTIONS. JUNE 20, 1972. ARG. 0186265, AUS. 0445064, BEL. 0760746, CAN. 0922768, EGR. 0088254, FRA. 7047143, GRB. 1282808, ITL. 0913849, JAP. 0773214, MEX. 0116655, SPN. 0386707, STZ. 0526137, SWD. 0366403.

3,694,073.—METHOD FOR DUPLEXING. SEPT. 26, 1972.

3,754,822.—SCANNING SYSTEM. AUG. 28, 1973.

3,844,653.—ROOF MIRROR COPYING SYSTEM. OCT. 29, 1974.

3,844,654.—DUPLEX COPYING SYSTEM. OCT. 29, 1974. FRA. 7340246.

3,847,478.—SEGMENTED BIAS ROLL. NOV. 12, 1974.

3,936,171.—ELECTROSTATOGRAPHIC METHODS AND APPARATUS. FEB. 3, 1976.

3,940,210.—PROGRAMMABLE CONTROLLER FOR CONTROLLING REPRODUCTION MACHINES. FEB. 24, 1976. BEL. 0832356, IRN. 0013436.

3,944,359.—PROGRAMMABLE CONTROLLER FOR CONTROLLING REPRODUCTION MACHINES. MAR. 16, 1976.

Class 1D 1D

3,674,475.—ENCLOSED MIGRATION IMAGING SYSTEM. JULY 4, 1972.

Class 1D 3

3,671,118.—APPARATUS FOR CREATING DUPLEX REPRODUCTIONS. JUNE 20, 1972. ARG. 0186265, AUS. 0445064, BEL. 0760746, CAN. 0922768, EGR. 0088254, FRA. 7047143, GRB. 1282808, ITL. 0913849, JAP. 0773214, MEX. 0116655, SPN. 0386707, STZ. 0526137, SWD. 0366403.

Class 1E

2,962,374.—COLOR XEROGRAPHY. NOV. 29, 1960.
2,962,375.—COLOR XEROGRAPHY. NOV. 29, 1960.
3,043,686.—XEROGRAPHIC COLOR MASKING. JULY 10, 1962. CAN. 0663888.
3,057,720.—XEROGRAPHIC COLOR REPRODUCTION. OCT. 9, 1962. GRB. 0956772.
3,227,549.—MULTIPLE IMAGE FORMING XEROGRAPHIC REPRODUCTION PROCESS. JAN. 4, 1966.
3,313,623.—LINE SEQUENTIAL COLOR XEROGRAPHY. APR. 11, 1967. CAN. 0880483, GRB. 1019974.
3,316,805.—COLOR DISPLAY. MAY 2, 1967.
3,357,830.—DYED IMAGE XEROGRAPHY. DEC. 12, 1967. CAN. 0821484, GER. 1277018, GRB. 1016581, ITL. 0679720, JAP. 0477809.
3,373,091.—DATA STORAGE DEVICE AND METHOD. MAR. 12, 1968.
3,386,379.—DUPLICATING WITH COLOR PRODUCING REAGENTS. JUNE 4, 1968. AUS. 0294747, CAN. 0842445, FRA. 1390006, GER. 1249089, GRB. 1043875, ITL. 0801548, JAP. 0611643.
3,508,823.—DUPLICATING APPARATUS. APR. 28, 1970.
3,583,806.—DYED IMAGE XEROGRAPHY. JUNE 8, 1971.
3,615,392.—ELECTROPHORETIC REPRODUCTION ORIGINAL CONTAINING BOTH MULTI-COLOR AND LINE AREAS. OCT. 26, 1971.
3,672,887.—ELECTROPHOTOGRAPHIC PROCESS FOR MULTICOLOR REPRODUCTION. JUNE 27, 1972.
3,687,661.—COLOR ELECTROPHOTOGRAPHIC PROCESS. AUG. 29, 1972. CAN. 0932785.
3,702,483.—COLOR RENDITION METHOD. NOV. 7, 1972. BEL. 0777015, CAN. 0935334, FRA. 7146255, GRB. 1361647, ITL. 0944210.
3,719,482.—IMAGING SYSTEM. MAR. 6, 1973.
3,724,943.—COLOR REPRODUCTION APPARATUS. APR. 3, 1973. CAN. 0946463.
3,734,607.—COLOR REPRODUCTION APPARATUS. MAY 22, 1973. ARG. 0184654, ATR. 0314352, AUS. 0459724, BEL. 0751490, CAN. 0946462, CHL. 0026265, DNK. 0130156, EGR. 0085001, FRA. 7020455, GRB. 1316499, ITL. 0893863, MEX. 0120285, NZL. 0160302, PNM. 0002259, PTG. 0053890, SAF. 0703775, SPN. 0380376, STZ. 0514164, SWD. 0359176.
3,799,668.—COLOR STANDARD AND METHOD OF CALIBRATING A MULTI-COLOR ELECTROPHOTGRAPHIC PRINTING MACHINE. MAR. 26, 1974. BEL. 0812179, SAF. 0741562.
3,799,774.—MULTI COLOR ELECTROPHOTOGRAPHIC MASKING PROCESS. MAR. 26, 1974.
3,805,283.—CHART CREATION APPARATUS. APR. 16, 1974.
3,869,203.—COLOR ELECTROPHOTOGRAPHIC PRINTING MACHINE. MAR. 4, 1975. BEL. 0820041.
3,884,686.—COLOR CORRECTION METHOD. MAY 20, 1975.
3,909,127.—MULTI-COLOR ORIGINAL FOR AN ELECTROPHOTOGRAPHIC PRINTING SYSTEM. SEPT. 30, 1975.
3,914,043.—COLOR ACCENTING COPYING MACHINE. OCT. 21, 1975.
3,936,182.—CONTROL ARRANGEMENT FOR AN ELECTROSTATOGRAPHIC REPRODUCTION APPARATUS. FEB. 3, 1976.
3,944,711.—TRANSPARENCY. MAR. 16, 1976.
3,960,445.—COLOR HIGHLIGHTING ELECTROPHOTOGRAPHIC PRINTING MACHINE. JUNE 1, 1976.
3,963,341.—A COLOR ELECTROPHOTOGRAPHIC PRINTING MACHINE. JUNE 15, 1976.
3,970,042.—COLOR DEVELOPMENT APPARATUS. JULY 20, 1976.

Class 1F

2,637,651.—METHOD OF PRODUCING IMAGES ON RIGID SURFACES. MAY 5, 1953. CAN. 0508329.
2,885,955.—XEROGRAPHIC MACHINE. MAY 12, 1959.
2,949,848.—STENCIL MAKING. AUG. 23, 1960. CAN. 0571449.
2,952,536.—METHOD OF PREPARING A LITHOGRAPHIC PRINTING PLATE. SEPT. 13, 1960.
2,954,291.—METHOD FOR PREPARING A SPIRIT DUPLICATING MASTER. SEPT. 27, 1960. CAN. 0583832.
2,955,035.—RAISED XEROGRAPHIC IMAGES. OCT. 4, 1960.
2,955,052.—METHOD OF FORMING A RAISED IMAGE. OCT. 4, 1960.
2,955,531.—STENCIL MASTER FORMATION. OCT. 11, 1960.
3,109,366.—METHOD FOR PATTERN REPRODUCTION. NOV. 5, 1963. CAN. 0624372.
3,109,367.—METHOD FOR PATTERN REPRODUCTION. NOV. 5, 1963. CAN. 0624374, FRA. 1146623, GER. 1029837, GRB. 0813637.
3,143,066.—PRODUCTION OF DUPLICATING MASTERS. AUG. 4, 1964. CAN. 0722954.
3,428,453.—IMAGE FORMING PROCESS UTILIZING XEROGRAPHY-ETCHING PROCESS. FEB. 18, 1969. CAN. 0856722, FRA. 1428775, GRB. 1085151, ITL. 0754825.
3,455,240.—IMAGING SYSTEM. JULY 15, 1969. CAN. 0823599, GER. 1571913, GRB. 1165676, JAP. 0594700.
3,460,476.—IMAGING PROCESS. AUG. 12, 1969. ARG. 0164839, AUS. 0418783, BEL. 0691755, CAN. 0882050, FRA. 1511173, GRB. 1168268, ITL. 0787662, JAP. 0562388, MEX. 0108240, SPN. 0346128, STZ. 0480672, SWD. 0331794, VZL. 0024009.
3,490,368.—PRINTING BY PARTICULATE IMAGES. JAN. 20, 1970. ARG. 0152222, ATR. 0281875, AUS. 0403243, BEL. 0674293, BRA. 0086720, 'CAN. 0824922, DNK. 0117303, FIN. 0047145, FRA. 1464987, GER. 1496169, GRB. 1128173, GRK. 0031516, HOL. 0145056, ITL. 0750153, JAP. 0547199, MEX. 0101075, NOR. 0130551, SAF. 0656968, SPN. 0321274, STZ. 0446906, SWD. 0355681, VZL. 0023998.
3,549,447.—IMAGING SYSTEM. DEC. 22, 1970.
3,559,570.—METHOD OF PREPARING AND USING A GRAVURE PRINTING PLATE. FEB. 2, 1971. CAN. 0844544, GRB. 1198142.
3,589,290.—RELIEF IMAGING PLATES MADE BY REPETITIVE XEROGRAPHIC PROCESSES. JUNE 29, 1971. CAN. 0896949.
3,615,128.—APPARATUS FOR ELECTROSTATIC PRINTING. OCT. 26, 1971. CAN. 0910956.
3,638,567.—METHOD OF PREPARING AND UTILIZING A GRAVURE PRINTING MASTER. FEB. 1, 1972.
3,806,354.—METHOD OF DEVELOPING ELECTROSTATIC LATENT IMAGES. APR. 23, 1974.
3,884,686.—COLOR CORRECTION METHOD. MAY 20, 1975.
3,919,938.—PERMANENT ELECTROSTATIC MASTER. NOV. 18, 1975.
3,923,504.—MIGRATION IMAGING MEMBER AND METHOD. DEC. 2, 1975.

Class 1G 1

3,043,685.—XEROGRAPHIC AND MAGNETIC IMAGE RECORDING AND REPRODUCING. JULY 10, 1962. CAN. 0611005, FRA. 1207840, GRB. 0902481.
3,093,039.—APPARATUS FOR TRANSFERRING POWDER IMAGES AND METHOD THEREFOR. JUNE 11, 1963. CAN. 0744873.
3,124,457.—DIFFERENTIAL IMAGE TRANSFER SYSTEM. MAR. 10, 1964. CAN. 0800184, GRB. 1031986, JAP. 0477375.
3,185,777.—MAGNETIC RECORDING. MAY 25, 1965.
3,485,621.—RECORDING BY PARTICLE ORIENTATION. DEC. 23, 1969. CAN. 0916777, GRB. 1188982, JAP. 0582501.
3,526,191.—DUPLICATING PROCESS EMPLOYING MAGNETIC DEVELOPER MATERIAL. SEPT. 1, 1970. CAN. 0903830, GRB. 1208307.
3,803,638.—RECORDING SYSTEM USING MAGNETIC CORE MATRIX. APR. 9, 1974.
3,875,576.—ELECTROSTATIC IMAGING SYSTEM WITH MAGNETIC TONER. APR. 1, 1975.

Class 1G 2

2,756,676.—METHOD FOR THE PRODUCTION OF ELECTROPHOTOGRAPHIC PRINTS. JULY 31, 1956. CAN. 0564672.
2,868,642.—ELECTROPHOTOGRAPHIC METHOD. JAN. 13, 1959. CAN. 0569364, FRA. 1146633, GER. 1050189, GRB. 0812419.

2,919,179.—RESIST FORMING METHOD. DEC. 29, 1959. CAN. 0616771.
3,592,642.—DUPL METH PAPR SHT HTS MELTG PT TONR IMG SIMUL CAUSE TRANSF TNR FRPHOTOCNDCR AND FSG TNR IMG ON PAP. JULY 13, 1971. BEL. 0706852, FRA. 1547828, GRB. 1198306, HUN. 0157321, ITL. 0815498.

Class 1G 3

3,275,436.—METHOD OF IMAGE REPRODUCTION UTILIZING A UNIFORM RELEASABLE SURFACE FILM. SEPT. 27, 1966. AUS. 0296158, CAN. 0811877, FRA. 1371894, GRB. 1033523, ITL. 0702168, JAP. 0508402.
3,438,772.—IMG RPDCTN INVLVNG ELCTROSTC TRSF OF RELESBL DONR FILM FRM PTOCNDTV INSLTNG LAYER TO ADHSV TRS. APR. 15, 1969. CAN. 0838044, GRB. 1124954, JAP. 0542587.
3,446,616.—XEROGRAPHIC IMAGING EMPLOYING A SELECTIVELY REMOVABLE LAYER. MAY 27, 1969.

Class 1G 4

2,968,552.—XEROGRAPHIC APPARATUS AND METHOD. JAN. 17, 1961. AUS. 0222058, CAN. 0624328, FRA. 1197798, GER. 1197326, GRB. 0876577.
3,166,418.—IMAGE DEVELOPMENT. JAN. 19, 1965. CAN. 0747566, FRA. 1259438, GER. 1190334, GRB. 0952609, JAP. 0418117.
3,619,054.—OIL FILM IMAGING APPARATUS. NOV. 9, 1971.

Class 1G 5

3,234,019.—METHOD FOR FORMATION OF AN ELECTROSTATIC IMAGE RESISTANT TO DETERIORATION ON STORAGE. FEB. 8, 1966. ATR. 0248873, AUS. 0266424, BEL. 0618720, FRA. 1325903, GER. 1295374, GRB. 1006231, IND. 0081730, ISR. 0017057, ITL. 0667262, SAF. 0001489, STZ. 0407176, SWD. 0307733.

Class 1G 6

3,084,043.—LIQUID DEVELOPMENT OF ELECTROSTATIC LATENT IMAGES. APR. 2, 1963. CAN. 0678365, GRB. 0880597.
3,869,896.—ROLLING PROCESS. MAR. 11, 1975. GRB. 1434131.
3,924,945.—APPARATUS FOR INDUCTIVE IMAGING WITH SIMULTANEOUS POLAR INK DEVELOPMENT. DEC. 9, 1975.
3,974,554.—QUANDRANGULAR TRIPETICORD GRAVURE ROLL. AUG. 17, 1976.

Class 1H 1

3,100,427.—PROJECTION DEVICE. AUG. 13, 1963.
3,166,419.—IMAGE PROJECTION. JAN. 19, 1965. CAN. 0699802, FRA. 1260843, GRB. 0955994.
3,166,420.—SIMULTANEOUS IMAGE FORMATION. JAN. 19, 1965. CAN. 0756267, GRB. 0955142.
3,185,050.—XEROGRAPHIC IMAGE PROCESSOR PROJECTOR. MAY 25, 1965.
3,196,765.—IMAGE DEVELOPMENT AND PROJECTION. JULY 27, 1965.
3,220,012.—SIMULTANEOUS RECORDING AND DISPLAY SYSTEM. NOV. 23, 1965. CAN. 0809339, FRA. 1373673, GER. 1303156, GRB. 1019900, ITL. 0695895, JAP. 0470425.
3,317,317.—XEROGRAPHIC METHOD OF MAKING A PARTICLE TRANSPARENCY PROJECTIBLE IMAGE. MAY 2, 1967.
3,320,061.—MASKING BY TOTAL INTERNAL REFLECTION FOR IMAGE REPRODUCTION AND DISPLAY. MAY 16, 1967. CAN. 0847533, FRA. 1401615, GER. 1497081, GRB. 1065986, ITL. 0729029, JAP. 0471308.
3,343,142.—XEROGRAPHIC CODING AND INFORMATION STORAGE ON A SPECULAR BUSINESS MACHINE CARD. SEPT. 19, 1967. CAN. 0844786, GRB. 1047261, JAP. 0701182.
3,519,344.—IMAGE PROJECTION. JULY 7, 1970.
3,543,031.—DEVICE AND PROCESS FOR IMAGE STORAGE. NOV. 24, 1970. ARG. 0161299, AUS. 0432468, BEL. 0703461, CAN. 0862332, FRA. 1543309, GER. 1549142, GRB. 1201374, ITL. 0811521, JAP. 0742514, MEX. 0100142, SPN. 0344004, STZ. 0497022, SWD. 0354169, VZL. 0023663.
3,593,832.—KEYBOARD INPUT DISPLAY DEVICE. JULY 20, 1971.
3,619,049.—XEROGRAPHIC IMAGERY USING A LONG PERSISTENCE PHOSPHOR INTERMEDIATE. NOV. 9, 1971.
3,955,977.—ELECTROSTATOGRAPHIC PROCESS. MAY 11, 1976.

Class 1H 2

3,437,408.—MULTIPLE COPY ELECTROSTATIC IMAGING APPARATUS. APR. 8, 1969. ARG. 0164840, ATR. 0283115, AUS. 0410817, BEL. 0704323, CAN. 0831674, CZC. 0156411, EGR. 0065587, FRA. 1538197, GRB. 1202583, HUN. 0161168, ITL. 0822157, JAP. 0582502, MEX. 0099950, SPN. 0345482, STZ. 0484459, SWD. 0331795, USR. 0353450, VZL. 0023662.
3,512,038.—PIN SYSTEM. MAY 12, 1970. CAN. 0873507, GRB. 1201497, JAP. 0623001.

Class 1I

3,011,473.—XEROGRAPHIC APPARATUS. DEC. 5, 1961. CAN. 0675698, GRB. 0971972.
3,041,167.—XEROGRAPHIC PROCESS. JUNE 26, 1962.
3,414,409.—PARTICLE TRANSFER. DEC. 3, 1968. BEL. 0713399, CAN. 0822324, FRA. 1568374, GRB. 1145026, ITL. 0829803.
3,543,022.—METH AND APPARATUS CHARG DISCRETE SMALL AREAS XEROGRAPHIC PLATES TO DIF POTENT CONT TONE PRINTG. NOV. 24, 1970. CAN. 0921971, GRB. 1186599.
3,682,677.—BACKGROUND REMOVAL. AUG. 8, 1972.
3,784,301.—ELECTROPHOTOGRAPHIC METHOD. JAN. 8, 1974.
3,883,349.—ELECTROPHOTOGRAPHIC CHARGING METHOD. MAY 13, 1975.
3,973,846.—ELECTROSTATIC MASTER MAKING APPARATUS. AUG. 10, 1976.

Class 1J

2,221,776.—ELECTRON PHOTOGRAPHY. NOV. 19, 1940.
2,588,699.—ELECTROPHOTOGRAPHIC APPARATUS. MAR. 11, 1952.
2,598,732.—ELECTROPHOTOGRAPHY. JUNE 3, 1952.
3,652,156.—LINEAR-TO-DRUM OPTICAL SCAN CONVERTER SYSTEM. MAR. 28, 1972.
3,766,850.—DEVELOPING MEANS FOR ELECTROSTATIC PRINTING APPARATUS. OCT. 23, 1973. CAN. 0972551, FRA. 7246855, GRB. 1415325, ITL. 0973310, SWC. 7216975.
3,954,463.—METHOD FOR ELECTROSTATIC PRINTING. MAY 4, 1976.

Class 1J 1

2,297,691.—ELECTROPHOTOGRAPHY. OCT. 6, 1942.
2,357,809.—ELECTROPHOTOGRAPHIC APPARATUS. SEPT. 12, 1944.
3,013,346.—XEROGRAPHIC APPARATUS. DEC. 19, 1961.
3,062,108.—ELECTROPHOTOGRAPHIC COPYING APPARATUS. NOV. 6, 1962.
3,062,109.—XEROGRAPHIC REPRODUCING APPARATUS. NOV. 6, 1962. ARG. 0149705, CAN. 0683779, CHL. 0024545, CLB. 0014851, COS. 0001435, FRA. 1291840, GER. 1290817, GRB. 0995414, GUA. 0001694, HGK. 0022168, ITL. 0646249, JAP. 0444672, KEN. 0167268, PNM. 0002135, PRU. 0008376, URG. 0007955, VZL. 0017266.
3,078,770.—XEROGRAPHIC REPRODUCING APPARATUS. FEB. 26, 1963. CAN. 0701741.
3,099,943.—XEROGRAPHIC REPRODUCING APPARATUS. AUG. 6, 1963. ADN. 0000468, ARG. 0169828, ATR. 0251420, AUS. 0270773, BEL. 0629050, BRA. 0082981, BRS. 00J3736, BRU. 0000369, CAN. 0738132, CHL. 0023724, CLB. 0015207, COS. 0001436, ECD. 0000022, FIJ. 0000340, FRA. 1346575, GHA. 0000997, GIB. 1032951, GIE. 0006569, GRB. 1032951, GRK. 0025939, GUA. 0001740, GUR. 1032951, HGK. 0008969, IND. 0086614, ISR. 0018757, ITL. 0752146, JAP. 0491155, JER. 0000P97, KEN. 0001743, LXB. 0043231, MAU. 1897571, MEX. 0074814, MLS. 0014969, NIG. 0001617, NOR. 0124476, NZL. 0134238, PRU. 0008375, PTG. 0040583, SAF. 0063737, SBH. 0005169, SGP. 0008069, SHL. 0000016, SLN. 1677286, SPN. 0286059, SRK. 0000387, STZ. 0425469, SWD. 0323285, UGD. 0000169, URG. 0007713, VZL. 0017049.
3,131,617.—XEROGRAPHIC REPRODUCING APPARATUS. MAY 5, 1964.
3,135,179.—XEROGRAPHIC APPARATUS. JUNE 2, 1964.
3,135,180.—XEROGRAPHIC APPARATUS. JUNE 2, 1964.

3,139,013.—DOCUMENT REPRODUCING APPARATUS. JUNE 30, 1964. CAN. 0727819, FRA. 1346596, GRB. 1016265, JAP. 0442652.
3,146,688.—XEROGRAPHIC MACHINE. SEPT. 1, 1964. ATR. 0249503, AUS. 0272158, BEL. 0616948, CAN. 0712269, FRA. 1324504, GER. 1295372, GRB. 1009867, JAP. 0464921.
3,182,573.—MASKED PLATE XEROGRAPHY. MAY 11, 1965. CAN. 0859657, FRA. 1353685, GRB. 1021882, ITL. 0694073, JAP. 0470242.
3,205,484.—ELECTROSTATIC MEMORY SYSTEM. SEPT. 7, 1965.
3,355,983.—CARD HANDLING MECHANISM. DEC. 5, 1967. CAN. 0814086, MEX. 0113373.
3,514,201.—RECORDING APPARATUS. MAY 26, 1970. CAN. 0880484.
3,520,602.—GRAPHIC DISPLAY DEVICE. JULY 14, 1970. CAN. 0838312.
3,536,395.—TRANSACTION RECORDING APPARATUS AND SYSTEM. OCT. 27, 1970. CAN. 0870184, GRB. 1213825.
3,580,671.—EXPOSURE APPARATUS. MAY 25, 1971. CAN. 0912104, GRB. 1276010.
3,677,633.—PORTABLE DOCUMENT ABSTRACTOR. JULY 18, 1972.
3,770,430.—PHOTOELECTROSCLOGRAPHIC IMAGING PROCESS. NOV. 6, 1973.
3,865,482.—ELECTROSTATOGRAPHIC COPYING MACHINE. FEB. 11, 1975.
3,917,396.—CONTROL SYSTEM. NOV. 4, 1975.
3,955,977.—ELECTROSTATOGRAPHIC PROCESS. MAY 11, 1976.

Class 1J 2

2,701,764.—ELECTROPHOTOGRAPHIC APPARATUS AND METHODS. FEB. 8, 1955.
2,892,391.—ELECTROPHOTOGRAPHIC CAMERA APPARATUS. JUNE 30, 1959.
3,057,275.—IMAGE KEEPING. OCT. 9, 1962.
3,185,051.—XEROGRAPHIC METHOD. MAY 25, 1965. CAN. 0740113, FRA. 1385444, GRB. 1026557, ITL. 0712017.
3,237,197.—IMAGE METHOD FOR ELECTROSTATIC RETENTION IN PHOTOCONDUCTIVE LAYERS. FEB. 22, 1966.

Class 1J 3

2,878,120.—INTERMITTENT ELECTROPHOTOGRAPHIC RECORDER—HORIZONS. MAR. 17, 1959. CAN. 0614984.
3,105,426.—XEROGRAPHIC APPARATUS. OCT. 1, 1963. CAN. 0689214, FRA. 1290414, GER. 1297476, GRB. 0989487, JAP. 0626117.
3,132,206.—HIGH SPEED PRINTING APPARATUS. MAY 5, 1964. GRB. 0999043.
3,649,114.—MULTIPLE OUTPUT ELECTROSTATIC RECORDING SYSTEM. MAR. 14, 1972. ARG. 0200567, AUS. 0447901, CAN. 0923542, NZL. 0160104.

Class 1J 4

3,148,601.—XEROGRAPHIC REPRODUCING APPARATUS. SEPT. 15, 1964.
3,187,651.—XEROGRAPHIC REPRODUCING APPARATUS. JUNE 8, 1965. FRA. 1338861, GER. 1797533, GRB. 1015633, HGK. 0013368, JAP. 0441423, KEN. 0167368.
3,196,767.—DOCUMENT COPY MECHANISM. JULY 27, 1965. CAN. 0731929, GRB. 1032953, JAP. 0651995.
3,399,610.—XEROGRAPHIC APPARATUS. SEPT. 3, 1968. CAN. 0819923.
3,788,203.—JUSTIFICATION APPARATUS. JAN. 29, 1974. CAN. 0989929, GRB. 1380831.

Class 1J 5

2,600,580.—ELECTROPHOTOGRAPHIC APPARATUS. JUNE 17, 1952.
2,647,464.—ELECTROGRAPHY. AUG. 4, 1953.
2,791,949.—XEROGRAPHIC COPYING DEVICE. MAY 14, 1957. CAN. 0577962.
2,878,732.—XEROGRAPHIC COPIER. MAR. 24, 1959. CAN. 0596022.
3,009,402.—XEROGRAPHIC PROCESSING APPARATUS. NOV. 21, 1961.
3,040,621.—XEROGRAPHIC PLATE SUPPORTING APPARATUS. JUNE 26, 1962.
3,083,869.—XEROGRAPHIC PLATE MAGAZINE AND FEEDING APPARATUS. APR. 2, 1963.
3,091,160.—XEROGRAPHIC PLATE FEEDING AND SUPPORTING APPARATUS. MAY 28, 1963.
3,160,057.—XEROGRAPHIC PROCESSING APPARATUS. DEC. 8, 1964.
3,272,101.—XEROGRAPHIC APPARATUS. SEPT. 13, 1966.
3,520,605.—DOCUMENT SCAN DRIVE AND RETURN APPARATUS. JULY 14, 1970. CAN. 0858848.
3,697,160.—CONTINUOUS IMAGING APPARATUS. OCT. 10, 1972.

Class 1J 6

RE.27,776.—ROLLER ASSEMBLY FR BELT-TYPE PHOTORECEPTR IN ELECTROSTATC PRNTNG MACHINES—RE OF D1480—3,536. OCT. 9, 1973.
2,624,652.—GRAPHIC RECORDING. JAN. 6, 1953.
3,190,199.—XEROGRAPHIC COPYING APPARATUS. JUNE 22, 1965. CAN. 0709970, GRB. 1033834, JAP. 0477813.
3,435,693.—BELT TRACKING DEVICE. APR. 1, 1969. ARG. 0168295, ATR. 0283116, AUS. 0421893, BEL. 0705641, CAN. 0853440, CHL. 0023084, CLB. 0017528, DNK. 0117047, FRA. 1543079, GRB. 1180659, ITL. 0827782, MEX. 0100320, NOR. 0124530, PRU. 0009336, SAF. 0676414, SPN. 0346430, STZ. 0471736, URG. 0009729, VZL. 0023676.
3,661,452.—XEROGRAPHIC REPRODUCTION MACHINE. MAY 9, 1972. ARG. 0169621, AUS. 0442749, BEL. 0733407, CAN. 0910959, CHL. 0024800, DNK. 0125257, FRA. 6917084, GRB. 1264406, ITL. 0877771, MEX. 0115542, PNM. 0001759, PRU. 0010640, SPN. 0367613, STZ. 0491418, TIW. 0006498, USR. 0358875, VZL. 0026279.
3,664,204.—BELT ASSEMBLY FOR USE IN AN ELECTROSTATIC PRINTING MACHINE. MAY 23, 1972. ARG. 0193980, BEL. 0777322, CAN. 0939735, FRA. 7147893, GRB. 1372389, ITL. 0944437, MEX. 0128274, VZL. 0032791.
3,730,623.—VACUUM HOLDDOWN DEVICE FOR MOVING BELTS. MAY 1, 1973. ARG. 0191239, BEL. 0777323, CAN. 0940591, FRA. 7147894, GRB. 1372390, ITL. 0944436, MEX. 0127634.
3,765,757.—TRANSPORT ARRANGEMENT FOR THIN SHEET MATERIAL. OCT. 16, 1973. BEL. 0793551, GRB. 1419978, ITL. 0972846, SPN. 0410107.
3,790,271.—PROCESSING CONTROL SYSTEM FOR PRINTING MACHINES. FEB. 5, 1974. CAN. 0986173, SPN. 0418256.
3,801,092.—VACUUM HOLD-DOWN DEVICE FOR MOVING BELTS. APR. 2, 1974. ARG. 0191239, BEL. 0777323, CAN. 0940591, FRA. 7147894, GRB. 1372390, ITL. 0944436, MEX. 0127634.
3,860,340.—OPTICAL ALIGNMENT ON VACUUM PLENUM. JAN. 14, 1975. BEL. 0784630, FRA. 7220686, GRB. 1379674, ITL. 0956164.
3,867,027.—TRANSPORT ARRANGEMENT FOR THIN SHEET MATERIAL. FEB. 18, 1975. BEL. 0793551, GRB. 1419978, ITL. 0972846, SPN. 0410107.
3,907,650.—PHOTOSENSITIVE BINDER LAYER FOR XEROGRAPHY. SEPT. 23, 1975.
3,914,126.—NICKEL OXIDE INTERLAYERS FOR PHOTOCONDUCTIVE ELEMENTS. OCT. 21, 1975.
3,961,849.—ELECTROSTATIC PRINTING MACHINE. JUNE 8, 1976. ARG. 0200108, ATR. 0323556, AUS. 0458405, BEL. 0776599, CAN. 0948274, FRA. 7145342, GRB. 1374799, ITL. 0943875, MEX. 0127493, PNM. 0718307, SAF. 0718307, SPN. 0397851, STZ. 0554009, SWD. 7115731, VZL. 0032936.

Class 1J 7

3,099,944.—XEROGRAPHIC CONTROL APPARATUS. AUG. 6, 1963. CAN. 0738131, IND. 0096308, JAP. 0491992.
3,512,885.—ACCOUNTING DEVICE FOR XEROGRAPHIC REPRODUCING APPARATUS. MAY 19, 1970. ARG. 0152214, ATR. 0285324, AUS. 0409894, BEL. 0670170, BRA. 0086686, CAN. 0763624, CHL. 0022095, CLB. 0015661, COS. 0001881, DNK. 0125559, ECD. 0000019, EGR. 0050203, EIR. 0029756, ELS. 0000939, FRA. 1459931, GER. 1522804, GRB. 1122622, GRK. 0030861, GUA. 0001741, HOL. 0146300, IND. 0096570, ISR. 0024363, ITL. 0729658, JAP. 0513607, LXB. 0049537, MEX. 0079047, NOR. 0124392, NZL. 0142991, PAK. 0116058, PLP. 0005074, PNM. 0002079, PRU. 0008106, PTG. 0044651, SAF. 0655276, SPN. 0318011, STZ. 0438031, SWD. 0358037, TRK. 0013473, UAR. 0007497, URG. 0006622, VZL. 0023997.
3,588,472.—LOGIC CONTROL APPARATUS. JUNE 28, 1971. ARG. 0181590. ATR. 0279353, BEL. 0706629, BRA. 6793350, CAN. 0834957, FRA. 1567082, GRB. 1204719, ITL. 0815466, JAP. 0645591, LXB. 0054882, MEX. 0101675, VZL. 0023684.

3,734,610.—MICROFICHE VIEWER-COPIER WITH BILLING DATA STORAGE. MAY 22, 1973.
3,813,157.—CONTROL LOGIC FOR TROUBLE DETECTION AND RECOVERY. MAY 28, 1974.

Class 1J 8

3,094,049.—XEROGRAPHIC DEVELOPER MEASURING APPARATUS. JUNE 18, 1963.
3,301,152.—XEROGRAPHIC COPYING APPARATUS. JAN. 31, 1967.
3,348,521.—AUTOMATIC TONER CONTROL SYSTEM. OCT. 24, 1967. CAN. 0799398.
3,453,045.—XEROGRAPHIC DEVELOPMENT APPARATUS. JULY 1, 1969. CAN. 0852125, FRA. 1559973, GRB. 1213493, HUN. 0156188, ITL. 0832847, JAP. 0602169, USR. 0371739.
3,542,466.—DEVELOPMENT APPARATUS. NOV. 24, 1970. AUS. 0428620, BEL. 0725611, CAN. 0884213, FRA. 1598505, GRB. 1203167, ITL. 0870661, JAP. 0641479, SPN. 0361653, SWD. 0343694.
3,695,224.—CASCADE DEVELOPMENT. OCT. 3, 1972.
3,816,756.—AUTOMATIC BIAS CONTROL. JUNE 11, 1974.
3,851,966.—REPRODUCTION APPARATUS. DEC. 3, 1974. BEL. 808482.
3,869,896.—ROLLING PROCESS. MAR. 11, 1975. GRB. 1434131.
3,931,792.—ABRASIVE LIQUID DEVELOPING APPARATUS. JAN. 13, 1976.

Class 1K

T.940,022.—PRESSURIZED AND FILTERED XEROGRAPHIC SYSTEM. NOV. 4, 1975.
3,638,110.—DEVC FOR MEASRNG CHRG ON MATRIAL BY CONVRTNG INTO ELCTRCL SGNLS FRICTNL FORCS CAUSD BY CHARGE. JAN. 25, 1972. AUS. 0161306, BEL. 0746479, FRA. 7007991, GRB. 1280803, HUN. 0161306, ITL. 0892329, JAP. 0681943, PLD. 0069581, SPN. 0376910, STZ. 0519185, SWD. 0364418, USR. 0412696.
3,661,453.—ELECTROSTATIC LABEL PRINTER. MAY 9, 1972. CAN. 0927471, FRA. 7122950, GRB. 1345800, ITL. 0927543.
3,893,175.—RECORDER FOR MONITORING COPIERS. JULY 1, 1975. GRB. 1427292.

Class 1K 1

3,013,203.—XEROGRAPHIC ELECTROMETER APPARATUS. DEC. 12, 1961.
3,835,380.—ELECTROMETER SYSTEM. SEPT. 10, 1974.
3,852,668.—ELECTROMETER SYSTEM. DEC. 3, 1974.
3,898,001.—ELCTROMETR SYSTM FOR NON-CNTCT DETCTN OF ELCTRSTATC CHRGE ON A MVNG ELCTRSTGRPHC IMAGNG SURFACE. AUG. 5, 1975.
3,909,126.—MULTI-PROCESS CONTROL SYSTEM FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. SEPT. 30, 1975.
3,934,141.—APPARATUS FOR AUTOMATICALLY REGULATING THE AMOUNT OF CHARGE APPLIED TO AN INSULATING SURFACE. JAN. 20, 1976.
3,935,531.—ELECTROMETER WITH LOW VOLTAGE INDICATOR. JAN. 27, 1976.
3,935,532.—AUTOMATIC ZEROING ELECTROMETER. JAN. 27, 1976.

Class 1K 2

2,588,675.—ELECTROCOPY APPARATUS. MAR. 11, 1952. CAN. 0489580, FRA. 1017568, GRB. 0695450.
2,917,385.—REFLEX XEROGRAPHY. DEC. 15, 1959. CAN. 0577137.
3,335,003.—REFLEX XEROGRAPHIC PROCESS. AUG. 8, 1967. CAN. 0764912, FRA. 1415836, GER. 1261398, GRB. 1059657, ITL. 0741353, JAP. 0511404.
3,337,339.—SCREEN XEROGRAPHY. AUG. 22, 1967. AUS. 0291558, BEL. 0638029, CAN. 0729824, DNK. 0114045, FRA. 1404424, GER. 0114045, GRB. 1027354, HOL. 0130250, ITL. 0706191, JAP. 0489562, LXB. 0044538, NOR. 0109228, SWD. 0321859.
3,676,118.—REFLEX XEROGRAPHY IMAGING SYSTEM. JULY 11, 1972.

Class 1K 3

3,926,626.—CIRCULATION IMAGING METHOD. DEC. 16, 1975.

Class 1L

3,836,362.—IMAGING METHOD. SEPT. 17, 1974.

Class 17E

3,975,289.—CHARGE TRANSFER COMPLEXEX OF FERRONCENES HAVING LIGHT FILLING PROPERTIES. AUG. 17, 1976.

Class 2A

2,666,144.—ELECTRORADIOGRAPHY. JAN. 12, 1954. AUS. 0160250, CAN. 0513474, FRA. 1043156, GRB. 0721944, ITL. 0477981, SAF. 0012711, STZ. 0300623, SWD. 0149520.
2,863,767.—XEROGRAPHIC METHOD. DEC. 9, 1958. CAN. 0580777, FRA. 1147979, GER. 1029673, GRB. 0804695.
3,856,461.—REPRODUCTION MACHINE FUSER. DEC. 24, 1974.
3,856,462.—REPRODUCTION MACHINE FUSER. DEC. 24, 1974. BEL. 0821050.
3,877,936.—PHOTOCONDUCTIVE COPOLYMER OF N-VINYLCARBAZOLF AND N-VINYLPHTHALIMIDE. APR. 15, 1975. BEL. 0812436.
3,883,921.—CLEANING ROLL APPARATUS HAVING REJUVENATED CLEANING SURFACE. MAY 20, 1975.

Class 2A 1

3,764,315.—AMBIPOLAR ELECTROPHOTOGRAPHIC PLATE. OCT. 9, 1973. BEL. 0802608, GRB. 1421948.
3,948,656.—IMPROVED METHOD FOR THE PREPARATION OF CDSSE. APR. 6, 1976.

Class 2A 1A

2,657,152.—PROCESS OF PRODUCING AN ELECTROPHOTOGRAPHIC PLATE. OCT. 27, 1953. AUS. 0152887, CAN. 0516075, FRA. 1039677, GER. 0893010, GRB. 0687704, HOL. 0082956, SAF. 0012307, STZ. 0296692, SWD. 0148967.
2,663,636.—ELECTROPHOTOGRAPHIC PLATE AND METHOD OF PRODUCING SAME. DEC. 22, 1953. CAN. 0512461, GER. 0872427, GRB. 0693112, HOL. 0095533, SAF. 0012644, STZ. 0290324, SWD. 0148966.
2,753,278.—METHOD FOR THE PRODUCTION OF A XEROGRAPHIC PLATE. JULY 3, 1956. CAN. 0543309.
2,862,817.—CRYSTALLINE SELENIUM PLATE. DEC. 2, 1958.
2,919,119.—XEROGRAPHIC PLATE CONDITIONING APPARATUS. DEC. 29, 1959. CAN. 0616780.
2,970,906.—XEROGRAPHIC PLATE AND A PROCESS OF COPY MAKING. FEB. 7, 1961. CAN. 0576158.
3,011,474.—XEROGRAPHIC DEVELOPMENT ELECTRODE APPARATUS. DEC. 5, 1961. CAN. 0701149, GRB. 0948138.
3,077,386.—PROCESS FOR TREATING SELENIUM. FEB. 12, 1963. CAN. 0705359.
3,170,790.—RED SENSITIVE XEROGRAPHIC PLATE AND PROCESS THEREFOR. FEB. 23, 1965.
3,174,855.—METHOD FOR A PRODUCTION OF A XEROGRAPHIC PLATE. MAR. 23, 1965.
3,234,020.—PLATE FOR ELECTROSTATIC ELECTROPHOTOGRAPHY. FEB. 8, 1966.
3,460,296.—METAL WORKING. AUG. 12, 1969. BEL. 0705574, CAN. 0853918, GRB. 1196684.
3,488,896.—PROCESS OF PUMICING A SURFACE. JAN. 13, 1970.
3,489,560.—PHOTOCONDUCTIVE LAYR COMPRISN SELENIUM COMPOUND AND SOLID HYDROPHOBIC METL SALT OF A FATTY ACID. JAN. 13, 1970. BEL. 0711297, CAN. 0871632, FRA. 1544448, GRB. 1203237.
3,954,464.—METHOD OF FABRICATING A COMPOSITE TRIGONAL SELENIUM PHOTORECEPTOR. MAY 4, 1976.
3,961,953.—METHOD OF FABRICATING COMPOSITES TRIGONAL SELENIUM PHOTORECEPTORS. JUNE 8, 1976.

Class 2A 1B

2,822,300.—PHOTOCONDUCTIVE MATERIAL HORIZONS. FEB. 4, 1958. CAN. 0665880.
3,312,548.—XEROGRAPHIC PLATES. APR. 4, 1967. BEL. 0691217, CAN. 0819658, FRA. 1505803, GRB. 1165579, JAP. 0650232.
3,467,548.—METHOD OF MAKING XEROGRAPHIC PLATE BY VACUUM EVAPORATION OF SELENIUM ALLOY. SEPT. 16, 1969.

3,490,903.—ALLOYS OF ANTIMONY AND SELENIUM USED IN PHOTOCONDUCTIVE ELEMENTS. JAN. 20, 1970. AUS. 0412949, CAN. 0871074, FRA. 1533536, GRB. 1185389, ITL. 0805955, JAP. 0626127, SWD. 0318193.

3,511,649.—PROCESS OF REDUCING FATIGUE IN PHOTOCONDUCTIVE GLASSES. MAY 12, 1970. GRB. 1193472, JAP. 0604152.

3,524,745.—PHOTOCONDUCTIVE ALLOY OF ARSENIC ANTIMONY AND SELENIUM. AUG. 18, 1970. ARG. 0164055, AUS. 0410443, BEL. 0709132, CAN. 0884810, CHL. 0024255, FRA. 1550902, GRB. 1209971, IND. 0113988, ITL. 0833508, JAP. 9124370, LXB. 0055231, MEX. 0108993, NOR. 0127943, NZL. 0151243, PRU. 0009904, PTG. 0048919, SAF. 0680228, SPN. 0349235, STZ. 0495573, SWD. 0328189, URG. 0009683.

3,615,413.—INDIUM DOPING OF A SE-AS PHOTOCONDUCTIVE ALLOYS. OCT. 26, 1971. CAN. 0917981, GRB. 1309312, JAP. 0739528.

3,655,377.—TRI-LAYERED SELENIUM DOPED PHOTORECEPTOR. APR. 11, 1972.

3,660,086.—ELCTRPHTGRPC PLATE AND PROCS EMPLYNG INORGNC PHOTCNDCTV MATRL W/PHOTOCHROMIC SENSITIVE AGENT. MAY 2, 1972.

3,685,989.—AMBIPOLAR PHOTORECEPTOR AND METHOD OF IMAGING. AUG. 22, 1972. CAN. 0971800, GRB. 1360078.

3,697,265.—VTRS SELNUM ALLY MTRX CNTNING ISLTD PRTCLS/PRTCL NETWKS OF RSN. OCT. 10, 1972. ARG. 0183560, ATR. 0299699, AUS. 0449439, BEL. 0752439, CAN. 0933014, EGR. 0090944, FRA. 7023472, GRB. 1319341, ITL. 0894623, MEX. 0116409, PNM. 0002539, SPN. 0409740, STZ. 0000000, SWD. 7216008, TIW. 0006838, USR. 0374867, VZL. 0031909.

3,879,199.—SURFACE TREATMENT OF ARSENIC-SELENIUM PHOTOCONDUCTORS. APR. 22, 1975.

3,884,688.—PHOTOSENSITIVE ELEMENT EMPLOYING A VITREOUS BISMUTH-SELENIUM FILM. MAY 20, 1975.

3,887,368.—COMPOSITION. JUNE 3, 1975.

3,898,083.—HIGH SENSITIVITY VISIBLE INFRARED PHOTOCONDUCTOR. AUG. 5, 1975.

3,909,458.—PHOTOSENSITIVE VITREOUS LAYER COMPRISING BISMUTH AND SELENIUM. SEPT. 30, 1975.

Class 2A 1C

2,844,493.—HIGH RESISTANCE PHOTOCONDUCTOR HORIZONS. JULY 22, 1958.

2,844,543.—TRANSPARENT PHOTOCONDUCTIVE COMPOSITION - HORIZONS. MAR. 18, 1955.

2,863,768.—XEROGRAPHIC PLATE. DEC. 9, 1958.

2,901,349.—XEROGRAPHIC PLATE - SELENIUM PLATE WITH ARSENIC TRISULFIDE INTERFACE. AUG. 25, 1959.

3,379,527.—PHOTOCONDUCTIVE INSULATORS COMPRISING ACTIVATED SULFIDES SELENIDES AND SULFOSELENIDES OF CADMIUM. APR. 23, 1968. CAN. 0907921, GRB. 1079065.

3,867,145.—METHANOL AND HEAT TREATED ZINC OXIDE. FEB. 18, 1975.

3,971,742.—ORGANO-CHALCOGEN COMPOSITIONS. JULY 27, 1976.

Class 2A 1C 1

3,140,174.—PROCESS FOR OVERCOATING A XEROGRAPHIC PLATE. JULY 7, 1964. GRB. 0960871.

3,682,631.—METHOD OF FORMING AN ELECTROPHOTOGRAPHIC LAYER CONTAINING A BENZOQUANAMINE RESIN BINDER. AUG. 8, 1972.

Class 2A 1D

3,469,978.—PHOTOSENSITIVE ELEMENT. SEPT. 30, 1969. CAN. 0872173, GRB. 1171909, JAP. 0552967.

3,522,040.—PHOTOSENSITIVE INSULATING MATERIAL. JULY 28, 1970. CAN. 0884808, GRB. 1171910, JAP. 0552966.

3,627,573.—COMPOSITION AND METHOD. DEC. 14, 1971. ARG. 0176480, AUS. 0441224, BEL. 0721965. CAN. 0892493, FRA. 0095985, GRB. 1251630, ITL. 0889828, MEX. 0124897, SPN. 0358960, STZ. 0517359, VZL. 0030358.

Class 2A 1E

2,277,013.—ELECTRIC RECORDING AND TRANSMISSION OF PICTURES. MAR. 17, 1942.

2,662,832.—PROCESS OF PRODUCING AN ELECTROPHOTOGRAPHIC PLATE. DEC. 15, 1953.

2,803,541.—XEROGRAPHIC PLATE. AUG. 20, 1957. CAN. 0563401, FRA. 1105562, GER. 0941767, GRB. 0755683.

2,962,376.—XEROGRAPHIC MEMBER. NOV. 29, 1960.

3,238,150.—PHOTOCONDUCTIVE CADMIUM SULFIDE POWDER AND METHOD FOR THE PREPARATION THEREOF. MAR. 1, 1966. CAN. 0712516, GRB. 1062022, JAP. 0486530.

3,879,200.—NOVEL XEROGRAPHIC PLATE CONTAINING PHOTOINJECTING BIX-BENZIMIDAZOLE PIGMENTS. APR. 22, 1975. ARG. 0188392, AUS. 0465970, BEL. 0763545, BRA. 0088118, CAN. 0928125, CHL. 0027130, EGR. 0093279, FRA. 7107565, GRB. 1337222, ITL. 0919105, MEX. 0122169, PNM. 0002460, SAF. 0711225, SPN. 0388590, TIW. 0008178, USR. 0449515.

3,909,261.—XEROGRAPHIC IMAGING MEMBER HAVING PHOTOCONDUCTIVE MATERIAL IN INTERLOCKING CONTINUOUS PATHS. SEPT. 30, 1975. ARG. 0186443, ATR. 0451252, BEL. 0763544, CAN. 0925741, CHL. 0026794, FRA. 7107567, GRB. 1296291, ITL. 0918909, MEX. 0122096, NZL. 0162891, PLP. 0009378, PNM. 0002396, SAF. 0711227, SPN. 0388639, STZ. 0568591, SWD. 0367259, TIW. 0007844, USR. 0398062.

Class 2A 1E 1

2,937,944.—XEROGRAPHIC LIGHT-SENSITIVE MEMBER AND PROCESS THEREFOR. MAY 24, 1960. AUS. 0242066, BEL. 0586070, CAN. 0610194, FRA. 1243723, GER. 1165408, GRB. 0894371, ITL. 0620746, JAP. 0318674, STZ. 0394806.

3,077,398.—XEROGRAPHIC PLATE MADE BY CAST COATING. FEB. 12, 1963.

Class 2A 1E 2

3,008,825.—XEROGRAPHIC LIGHT-SENSITIVE MEMBER AND PROCESS THEREFOR. NOV. 14, 1961. CAN. 0610195.

Class 2A 1F

3,394,001.—ELECTROPHOTOGRAPHIC SENSITIVE MATERIAL CONTAINING ELECTRON-DONOR DYE LAYERS. JULY 23, 1968. GRB. 1106562.

3,498,835.—METHOD FOR MAKING XEROGRAPHIC PLATES. MAR. 3, 1970. ARG. 0154134, AUS. 0418468, BEL. 0700454, CAN. 0872174, FRA. 1529285, GRB. 1189504, ITL. 0807717, JAP. 0567234, MEX. 0096199, SPN. 0342303, STZ. 0479093, SWD. 0332346, VZL. 0024014.

3,532,496.—XRGRPHC PLTS AND PROCS EMPLYNG HMGNUS DISPRSNS OF VTREOUS SLNIUM AND SNSTZNG DYES AS PHTCNDCTV LAYER. OCT. 6, 1970.

Class 2A 1G

3,288,603.—METHOD OF RESTORING XEROGRAPHIC PROPERTIES TO A GLASS BINDER PLATE. NOV. 29, 1966. CAN. 0800955, FRA. 1432127, GER. 1497201, GRB. 1088473, ITL. 0802168, JAP. 0519677.

3,397,982.—XIC PLATE W/INORGANIC GLASS BINDER HAVING OVERCOATING CONSISTING ESSENTIALLY OF ALUMINUM OXIDE. AUG. 20, 1968. ARG. 0150690, AUS. 0407349, BEL. 0674140, CAN. 0866142, FRA. 1460232, GER. 1497230, GRB. 1129674, ITL. 0822914, JAP. 0531894, MEX. 0085270, SWD. 0319976.

3,451,846.—PROCESS OF MAKING XEROGRAPHIC PLATE. JUNE 24, 1969. CAN. 0818384, GRB. 1183961, JAP. 0598621.

3,510,298.—PROCESS OF ACTIVATING PHOTOCONDUCTIVE MATERIAL IN GLASS BINDER. MAY 5, 1970. CAN. 0834668, GER. 1572366, GRB. 1189822, JAP. 0552968.

3,537,848.—PROCESS OF TREATING A XEROGRAPHIC GLASS BINDER PLATE AND PRODUCT. NOV. 3, 1970. ARG. 0180580.

3,655,376.—ELECTROPHOTOGRAPHIC DENITRIFIED GLASS BINDER PLATE. APR. 11, 1972.

3,885,962.—PHOTOGRAPHIC AND ELECTROPHOTOGRAPHIC MEMBERS WITH GLASS FIBER CONTAINING PAPER SUBSTRATES. MAY 27, 1975.

Class 2A 2

3,657,272.—PROCESS FOR PREPARING X-FORM METAL FREE PHTHALOCYANINE. APR. 18, 1972.

3,738,831.—CHALCOGEN ORGANIC COMPOUNDS USED IN ELECTROPHOTOGRAPHIC PLATES AND PROCESS. JUNE 12, 1973.

3,758,301.—ELECTROPHOTOGRAPHIC USE OF SELENIUM CONTAINING POLYMERS. SEPT. 11, 1973.

3,770,428.—ORGANIC PHOTOCONDUCTIVE MATERIAL. NOV. 6, 1973.

3,864,144.—PROCESS FOR PREPARATION OF PHOTOCONDUCTIVE FILMS FROM INTRACTABLE MATERIALS. FEB. 4, 1975. GRB. 1414158, TIW. 0008534.

3,870,516.—METHOD OF IMAGING PHOTOCONDUCTOR IN CHARGE TRANSPORT BINDER. MAR. 11, 1975. AUS. 0466028, BEL. 0763541, CAN. 0931413, CHL. 0026797, EGR. 0094762, FRA. 7107559, GRB. 1343671, ITL. 0919108, MEX. 0122098, NZL. 0162883, PNM. 0002450, SAF. 0711219, SPN. 0388584, STZ. 0567744.

3,877,936.—PHOTOCONDUCTIVE COPOLYMER OF N-VINYLCARBAZOLE AND N-VINYLPHTHALIMIDE. APR. 15, 1975. BEL. 0812436.

3,879,198.—ELECTROPHOTOGRAPHIC AMBIPOLAR PHOTOCONDUCTIVE COMPOSITION AND IMAGING METHOD. APR. 22, 1975.

3,882,087.—ORGANIC PHOTOCONDUCTIVE MATERIAL. MAY 6, 1975.

3,903,107.—DIRECT ALPHA TO X PHASE CONVERSION OF METAL CONTAINING PHTHALOCYANINE. SEPT. 2, 1975. BEL. 0815632, SAF. 0743536.

3,917,483.—PHOTOINDUCED ACID CATALTZED DEPOLYMERIZATION OF DEGRADABLE POLYMERS. NOV. 4, 1975.

3,923,762.—PROCESS FOR PREPARATION OF 2-ANTHRYL AND SUBSTITUTED 2-ANTHRYL FUNCTIONAL MONOMERS AND P. DEC. 2, 1975. BEL. 0822305, STZ. 0032598.

3,926,629.—ELECTROPHOTOGRAPHIC METHOD AND PLATE EMPLOYING A PHTHALOCYANINE POLYMER. DEC. 16, 1975.

3,932,180.—DIRECT ALPHA TO X PHASE CONVERSION OF METAL-FREE PHTHALOCYANINE. JAN. 13, 1976. BEL. 0815632, SAF. 0743536.

3,943,108.—PHOTOCONDUCTIVE COMPOSITION OF AN ALDEHYDE CONDENSATE. MAR. 9, 1976.

3,954,906.—AMBIPOLAR PHOTOCONDUCTIVE COMPOSITION AND IMAGING METHOD. MAY 4, 1976.

3,970,602.—COPOLYMERS OF N-VINYLCARBAZOLE AND N-VINYLPHTHALIMIDE AND DERIVATIVES THEREOF. JULY 20, 1976. BEL. 0812436.

Class 2A 2A

3,408,181.—HEAT DEFORMABLE RECORDING MATERIALS CONTAINING PHOTOCONDUCTIVE RESINOUS CHARGE TRANSFER COMPLE. OCT. 29, 1968. CAN. 0843620, FRA. 1463744, GER. 1522677, GRB. 1138552, ITL. 0755286, MEX. 0109927.

3,432,415.—ELECTROPHORETIC IMG. PROCESS USING PHOTOSENSITIVE XANTHENONIUM SALTS. MAR. 11, 1969. AUS. 0439502, BEL. 0743895, CAN. 0851118, GER. 1522701, GRB. 1155747, JAP. 0650631, MEX. 0104632.

3,445,227.—ELECTROPHOTOGRAPHIC IMAGING PROCESSES EMPLOYING 2,4 DIAMINOTRIAZINES AS ELCTRCLY PHOTOSNSTV PRT. MAY 20, 1969. BEL. 0743891, CAN. 0852681, GER. 1522687, GRB. 1146019, JAP. 0617789.

3,447,922.—ELECTRICALLY PHOTOSENSITIVE PARTICLES USEFUL IN PHOTOELECTROPHORETIC AND XEROGRAPHIC IMAGING PROC. JUNE 3, 1969.

3,448,029.—ELECTROPHORETIC IMAGING PROCESS USING 8,13-DIOXODINAPTHO-2,1-B,2,3-D-FURAN-6-CARBOXAMIDE PIGMEN. JUNE 3, 1969.

3,448,030.—ELECTRICALLY PHOTOSENSITIVE PART. USEFUL IN PHOTOELECTROPHORETIC AND XEROGRAPHIC IMAGING PROCESSE. JUNE 3, 1969. BEL. 0743893, CAN. 0943830, GRB. 1155554, JAP. 0686735.

3,482,970.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS USING NAPHTHYLAZO COMPOUNDS AS THE PRIMARY PHOTOCONDUCTOR. DEC. 9, 1969. AUS. 0453397, BEL. 0742978, CAN. 0869486, GRB. 1296390, ITL. 0878843, JAP. 0725059.

3,553,009.—PROCESS OF PREPARING AN ELECTROPHOTOGRAPHIC MATERIAL. JAN. 5, 1971.

3,594,163.—METHOD OF CONVERTING ALPHA PHTHALOCYANINE TO THE X FORM. JULY 20, 1971.

3,640,710.—PHTHALOCYANINE PHOTOCONDUCTIVE ELEMENTS CONTAINING MULTIPLE BINDER MATERIALS. FEB. 8, 1972. ARG. 0184666, ATR. 0328861, AUS. 0456430, BEL. 0760751, CAN. 0933012, FRA. 7047636, GRB. 1333605, ITL. 0913999, PNM. 0002243, STZ. 0554550, SWD. 0365878, TIW. 0006738, USR. 0450420, VZL. 0032928.

3,667,943.—QUINACRIDONE PIGMENTS IN ELECTROPHOTOGRAPHIC IMAGING. JUNE 6, 1972. ARG. 0184823, AUS. 0452663, BEL. 0737810, CAN. 0877882, EGR. 0077411, FRA. 6928700, GRB. 1278702, ITL. 0888005, SPN. 0370720, STZ. 0519183, SWD. 0346396, TIW. 0005517, USR. 0351396.

3,667,944.—QUINACRIDONE PIGMENTS IN ELECTROPHOTOGRAPHIC RECORDING. JUNE 6, 1972. ARG. 0177369, AUS. 0452031, BEL. 0741159, CAN. 0884807, FRA. 6937223, GRB. 1286079, ITL. 0879710, JAP. 0693421, MEX. 0115407.

3,667,945.—QUINACRIDONE PIGMENTS IN ELECTROPHOTOGRAPHIC IMAGING. JUNE 6, 1972.

3,708,292.—PI-FORM METAL PHTHALOCYANINE. JAN. 2, 1973. ARG. 0194234, BEL. 0783793, GRB. 1396922, ITL. 0955644, MEX. 0128928.

3,708,293.—PI-FORM METAL-FREE PHTHALOCYANINE. JAN. 2, 1973. ARG. 0195167, BEL. 0783792, GRB. 1395769, ITL. 0955643, MEX. 0131970.

3,761,261.—PHTHALOCYANINE DYE SENSITIZERS FOR ZINC OXIDE. SEPT. 25, 1973.

3,816,118.—ELECTROPHOTOGRAPHIC ELEMENT CONTAINING PHTHALOCYANINE. JUNE 11, 1974. ARG. 0156316, CAN. 0890855, FRA. 0091579, GRB. 1175451, ITL. 0809972, MEX. 0115884, VZL. 0024012.

3,850,630.—XEROGRAPHIC PLATE CONTAINING PHOTOINJECTING INDIGOLD PIGMENTS. NOV. 26, 1974. ARG. 0188393, AUS. 0465971, BEL. 0763391, CAN. 0932198, CHL. 0027129, EGR. 0093923, FRA. 7107566, GRB. 1337221, ITL. 0919106, MEX. 0122099, NZL. 0162890, PNM. 0002480, SAF. 0711226, SPN. 0388591, TIW. 0006740, USR. 0463276.

3,865,798.—PHOTOACTIVE POLYMERS INDUCED EXOCYCLIC QUARTET CONCEPT. FEB. 11, 1975. AUS. 0462805, BEL. 0790689, FRA. 7237458, GRB. 1411998, ITL. 0969902, MEX. 0133728, SPN. 0407984, STZ. 0028515.

3,877,935.—NOVEL XEROGRAPHIC PLATE CONTAINING PHOTOINJECTING POLYNUCLEAR QUINONE PIGMENTS. APR. 15, 1975. ARG. 0002614, AUS. 0452620, BEL. 0763389, CAN. 0932197, CHL. 0027120, FRA. 7107563, GRB. 1337224, GUA. 0002614, ITL. 0919103, MEX. 0122100, NZL. 0162887, PNM. 0002467, SAF. 0711223, SPN. 0388588, TIW. 0006741.

3,895,945.—PROCESS FOR PREPARATION OF A DYESTUFF SENSITIZED PHOTOCONDUCTIVE COMPOSITION. JULY 22, 1975.

3,899,328.—ACTIVE MATRIX AND INTRINSIC PHOTOCONDUCTIVE POLYMER OF A LINEAR POLYSILOXANE. AUG. 12, 1975.

3,899,329.—MIXTURE OF PHOTOCONDUCTORS IN AN ACTIVE MATRIX. AUG. 12, 1975. ARG. 0187047, ATR. 327000, AUS. 0450862, BEL. 0775968, CAN. 0971797, CHL. 0027272, FRA. 7143179, GRB. 1348138, GUA. 0002724, ITL. 0941822, MEX. 1328040, PNM. 0002602, SAF. 0718022, SPN. 397403, STZ. 0026771.

3,904,407.—XEROGRAPHIC PLATE CONTAINING PHOTOINJECTING PERYLENE PIGMENTS. SEPT. 9, 1975. ARG. 0189747, AUS. 0465811, BEL. 0763388, CAN. 0933010, CHL. 0026796, EGR. 0093458, FRA. 7107562, GRB. 1337225, GUA. 0002799, ITL. 0919102, MEX. 0126620, PNM. 0002468, SAF. 0711222, SPN. 0388587, SWD. 0362509, TIW. 0007210, USR. 0473381.

3,915,702.—PHTOELCTRC AND ELCTRPHTGRPHC PGMNTS COMPRISING DERIVATIVES OF CONDENSED PLYCYLC ARMATC HYDRCABN A. OCT. 28, 1975.

3,923,762.—PROCESS FOR PREPARATION OF 2-ANTHRYL AND SUBSTITUTED 2-ANTHRYL FUNCTIONAL MONOMERS AND P. DEC. 2, 1975. BEL. 0822305, STZ. 0032598.

3,927,026.—PROCESS OF MAKING X-FORM METAL PHTHALOCYANINE. DEC. 16, 1975. CAN. 0916703, GRB. 1312946, JAP. 0693981.

3,932,454.—PROCESS OF MAKING HEXAGONAL ALPHA METAL-FREE PHTHALOCYANINE. JAN. 13, 1976. CAN. 0918152, GRB. 1327084, JAP. 0752724.

3,941,085.—RELEASE MATERIAL APPLICATOR. MAR. 2, 1976.

Class 2A 2a

3,941,750.—POLYVINYL PYREMAL-AN INTRINSIC PHOTOCONDUCTOR AND ACTIVE MATRIX POLYMER. MAR. 2, 1976.

3,951,654.—MTHD ENHNCMT RATE AND EFFICIENCY OF PHOTODSCHG OF ELCTRPHGRIC IMAGING MEMBERS COMPRSNG PHTHALOCYA. APR. 20, 1976.

Class 2A 2B

3,408,182.—ELECTROPHOTOGRAPHIC MATERIALS AND METHODS EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRANSFER COMP. OCT. 29, 1968. CAN. 0847805, FRA. 1463743, GRB. 1137665, ITL. 0755290, JAP. 0572185, MEX. 0107318.

3,408,183.—ELECTROPHOTOGRAPHIC MATERIALS AND METHODS EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRANSFER COMP. OCT. 29, 1968. CAN. 0819066, FRA. 1463745, GER. 1522676, GRB. 1126048, ITL. 0755287, JAP. 0727091, MEX. 0106758.

3,408,184.—ELECTROPHOTOGRAPHIC MATERIALS AND METHODS EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRNSFR COMPLE. OCT. 29, 1968. CAN. 0818382, FRA. 1463727, GRB. 1137664, ITL. 0755289, JAP. 0726382, MEX. 0105835.

3,408,185.—ELECTROPHOTOGRAPHIC MATERIALS AND METHOD EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRANSFER COMP. OCT. 29, 1968. CAN. 0848383, FRA. 1463728, GER. 1645192, GRB. 1137476, ITL. 0755291, MEX. 0106763.

3,408,186.—ELECTROPHOTOGRAPHIC MATERIALS AND METHODS EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRNSFR COMPLE. OCT. 29, 1968. CAN. 0846736, FRA. 1463746, GRB. 1138629, ITL. 0755288, JAP. 0569483, MEX. 0106589.

3,408,187.—ELECTROPHOTOGRAPHIC MATER AND METH EMPLOYING PHOTOCONDUCTIVE RESINOUS CHARGE TRANSFER COMPLEXES. OCT. 29, 1968. CAN. 0867298, GER. 1522721, GRB. 1163097, JAP. 0797719.

3,408,188.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS COMPRISING PHOTOCONDUCTIVE CHARGE TRANSFER COMPLEXES. OCT. 29, 1968. CAN. 0869485, GRB. 1183516, JAP. 0797720.

3,408,189.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS EMPLOYING PHOTOCONDUCTIVE CHARGE TRANSFER COMPLEXES. OCT. 29, 1968.

3,408,190.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS EMPLOYING PHOTOCONDUCTIVE CHARGE TRANSFER COMPLEXES. OCT. 29, 1968. CAN. 0850019, GER. 1302772, GRB. 1182172.

3,879,201.—PERSISTENT PHOTOCONDUCTIVE COMPOSITIONS. APR. 22, 1975.

3,896,184.—POLYMERS OF BENZANTHRACENE AS ACTIVE MATRIX MATERIALS. JULY 22, 1975.

3,923,762.—PROCESS FOR PREPARATION OF 2-ANTHRYL AND SUBSTITUTED 2-ANTHRYL FUNCTIONAL MONOMERS AND P. DEC. 2, 1975. BEL. 0822305, STZ. 0032598.

Class 2A 2C

3,944,358.—COLOR IMAGE REPRODUCTION SYSTEMS. MAR. 16, 1976.

Class 2A 2

3,915,704.—PHOTOINDUCED ACID CATALYZED DEGRADATION OF DEGRADABLE POLYMERS. OCT. 28, 1975.

Class 2B

2,666,144.—ELECTRORADIOGRAPHY. JAN. 12, 1954. AUS. 0160250, CAN. 0513474, FRA. 1043156, GRB. 0721944, ITL. 0477981, SAF. 0012711, STZ. 0300623, SWD. 0149520.

3,617,265.—METHOD FOR PREPARING A RESIN OVERCOATED ELECTROPHOTOGRAPHIC PLATE. NOV. 2, 1971.

3,635,705.—MULTI-LAYERED HALOGEN-DOPED SELENIUM PHOTOCONDUCTIVE ELEMENT. JAN. 18, 1972. GRB. 1311329, ITL. 0901916, JAP. 0739531.

3,639,120.—2-LAYERED PHOTOCONDUCTIVE ELEMNT CONTNG A HALOGEN DOPED STORG LAYER AND SELENIUM ALLOY CNTRL LAYER. FEB. 1, 1972. CAN. 0870535, GRB. 1193876, JAP. 0558440.

3,655,377.—TRI-LAYERED SELENIUM DOPED PHOTORECEPTOR. APR. 11, 1972.

3,712,810.—AMBIPOLAR PHOTORECEPTOR AND METHOD. JAN. 23, 1973. CAN. 0971025, GRB. 1363266.

3,843,407.—BLADE CLEANING WITH REVERSE MOVEMENT. OCT. 22, 1974.

3,848,994.—LINE CHARGE TONER CLEANING. NOV. 19, 1974.

3,928,034.—ELECTRON TRANSPORT LAYER OVER AN INORGANIC PHOTOCONDUCTIVE LAYER. DEC. 23, 1975. AUS. 0453265, BEL. 0763542, CAN. 0932199, CHL. 0026802, EGR. 0093924, FRA. 7107560, GRB. 1337227, GUA. 0002423, ITL. 0919109, MEX. 0121682, NZL. 0162884, PNM. 0002473, SAF. 0711220, SPN. 0388585, STZ. 0576659, SWD. 0363176, TIW. 0007181.

Class 2B 1

2,901,348.—RADIATION SENSITIVE PHOTOCONDUCTIVE MEMBER. AUG. 25, 1959. CAN. 0575600, FRA. 1099631, GER. 1032669, GRB. 0789802.

2,917,385.—REFLEX XEROGRAPHY. DEC. 15, 1959. CAN. 0577137.

3,041,166.—XEROGRAPHIC PLATE AND METHOD. JUNE 26, 1962. CAN. 0617821, GRB. 0936649.

3,243,293.—PLATE FOR ELECTROSTATIC ELECTROPHOTOGRAPHY. MAR. 29, 1966. CAN. 0830430.

3,288,602.—XEROGRAPHIC PLATE AND METHOD. NOV. 29, 1966. CAN. 0795978, GER. 1237902, GRB. 1029181, ITL. 0690835, JAP. 0578399.

3,312,547.—XEROGRAPHIC PLATE AND PROCESSES OF MAKING AND USING SAME. APR. 4, 1967.

3,341,326.—DARK DECAY CONTROLLED XEROGRAPHY. SEPT. 12, 1967. AUS. 0285843, CAN. 0729829, FRA. 1377592, GRB. 1029199, ITL. 0706101.

3,352,669.—PHOTOCONDUCTIVE MEMBER AND PROCESSES OF PREPARING AND USING SAME. NOV. 14, 1967. AUS. 0405164, CAN. 0834670, FRA. 1422625, GER. 1497194, GRB. 1052970, HOL. 0137891, ITL. 0749420, JAP. 0501912.

3,393,070.—XEROGRAPHIC PLATE WITH ELECTRIC FIELD REGULATING LAYER. JULY 16, 1968. CAN. 0871308, GER. 1490987, GRB. 1141452, JAP. 0764435, MEX. 0105660.

3,508,918.—XEROGRAPHIC PLATE CONTAINING ALUMINUM SELENIDE BARRIER LAYER. APR. 28, 1970. CAN. 0872175.

3,539,255.—XEROGRAPHIC RECORDING APPARATUS - LIGHT-CONTROLLED-CHARGE STORAGE LAYER. NOV. 10, 1970.

3,573,906.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS. APR. 6, 1971. ARG. 0177890, AUS. 0441534, BEL. 0725173, BRA. 0088092, CAN. 0906801, CZC. 0157053, FRA. 1594981, GRB. 1217726, ITL. 0852743, SPN. 0379204, SWD. 0335063, USR. 0448658, VZL. 0029780.

3,619,153.—PHOTOCONDUCTIVE ELMNT AND PROCESS EMPLYNG SBSTUTD SILYLISOBUTYLETHYLENEDIAMINE ADHESIVE INTERLAYE. NOV. 9, 1971. ARG. 0180118, ATR. 0305764, AUS. 0434739, BEL. 0733402, BUL. 0017353, CAN. 0898034, DNK. 0131833, EGR. 0078900, FRA. 6917079, GRB. 1229559, GRK. 0040058, IND. 0121424, ISR. 0032250, ITL. 0864983, JAP. 0702563, LXB. 0058678, MEX. 0109385, NOR. 0125557, NZL. 0156506, PAK. 0121226, PLP. 0008481, PNM. 0001683, PTG. 0051754, RHD. 2236953, RMN. 0054256, SAF. 0693687, SPN. 0367618, STZ. 0511461, SWD. 0341926, TIW. 0006442, TRK. 0015647, USR. 0300036, VTM. 0001865.

3,713,821.—PHOTORECEPTOR INTERFACE. JAN. 30, 1973. ARG. 0194731, ATR. 0322357, AUS. 0464711, BEL. 0784453, CAN. 0964916, EGR. 0099870, FRA. 7220691, GRB. 1393612, ISR. 0039655, ITL. 0959793, SAF. 0723958, SPN. 0403454, STZ. 0554007, SWD. 0367491, VZL. 0032939.

3,720,514.—ELECTROPHOTOGRAPHIC PAPER HAVING AN IMONGANIC COLLOIDAL OXIDE COATING. MAR. 13, 1973.

3,738,831.—CHALCOGEN ORGANIC COMPOUNDS USED IN ELECTROPHOTOGRAPHIC PLATES AND PROCESS. JUNE 12, 1973.

3,758,301.—ELECTROPHOTOGRAPHIC USE OF SELENIUM CONTAINING POLYMERS. SEPT. 11, 1973.

3,795,513.—METHOD OF STORING AN ELECTROSTATIC IMAGE IN A MULTILAYERED PHOTORECEPTOR. MAR. 5, 1974. BEL. 0788303, CAN. 976018, FRA. 7230831, GRB. 1388934, ITL. 0964410, SWD. 7211341.

3,799,775.—XEROGRAPHIC SYSTEM. MAR. 26, 1974. ARG. 0172053, ATR. 0300559, AUS. 0423123, BEL. 0720940, BRA. 6800650, BUR. 0000043, CAM. 00043/3, CAN. 0895805, CHL. 0024257, EIR. 0032903, FRA. 1586238, GNR. 0000039, GRB. 1243384, GRK. 0039223, IND. 0119625, ISR. 0031543, ITL. 0844307, LEB. 0002816, LIB. P102693, LXB. 0056890, MEX. 0105163, MLG. 0003058, MLW. 00MW569, MNC. 8126975, MRC. 0014727, NOR. 0128132, NZL. 0153781, PAK. 0120895, PLP. 0009065, PNM. 0002053, PTG. 0050322, RHD. 5369487, SAF. 0681107, SPN. 0358355, STZ. 0506102,

SWD. 0345530, TGR. 0000547, URG. 0009361, VTM. 0001830, VZL. 0023696, ZMB. 0156971.

3,816,288.—GLOW DISCHARGE TECHNIQUE FOR THE PREPARATION OF ELECTROPHOTOGRAPHIC PLATES. JUNE 11, 1974.

3,895,131.—ELECTROLESS COATING METHOD. JULY 15, 1975.

3,907,650.—PHOTOSENSITIVE BINDER LAYER FOR XEROGRAPHY. SEPT. 23, 1975.

3,914,126.—NICKEL OXIDE INTERLAYERS FOR PHOTOCONDUCTIVE ELEMENTS. OCT. 21, 1975.

3,958,207.—INJECTION CURRENT DEVICE AND METHOD. MAY 18, 1976.

Class 2B 2

2,860,048.—XEROGRAPHIC PLATE. NOV. 11, 1958.

2,886,434.—PROTECTED PHOTOCONDUCTIVE ELEMENT AND METHOD OF MAKING SAME—HORIZONS. MAY 12, 1959. CAN. 0621931.

3,092,493.—PROTECTED XEROGRAPHIC PLATE. JUNE 4, 1963.

3,146,145.—PROCESS FOR ADHERING PLASTIC TO VITREOUS SELENIUM. AUG. 25, 1964.

3,256,089.—MASKED PLATE XEROGRAPHY. JUNE 14, 1966.

3,397,982.—XIC PLATE W/INORGANIC GLASS BINDER HAVING OVERCOATING CONSISTING ESSENTIALLY OF ALUMINUM OXIDE. AUG. 20, 1968. ARG. 0150690, AUS. 0407349, BEL. 0674140, CAN. 0866142, FRA. 1460232, GER. 1497230, GRB. 1129674, ITL. 0822914, JAP. 0531894, MEX. 0085270, SWD. 0319976.

3,434,832.—XEROGRAPHIC PLATE COMPRISING A PROTECTIVE COATING OF A RESIN MIXED WITH A METALLIC STEARATE. MAR. 25, 1969. CAN. 0835883, FRA. 1454672, GER. 1497223, GRB. 1128156, ITL. 0772535, JAP. 0545757, MEX. 0085603.

3,488,189.—ELECTROPHOTOGRAPHIC RECORDING MEMBER HAVING SOLID CRYSTALLINE PLASTICIZR AVAILBL AT IMGNG SURFA. JAN. 6, 1970. CAN. 0866700, FRA. 1506810, GRB. 1183205, ITL. 0788976, JAP. 0570734, MEX. 0108241.

3,720,514.—ELECTROPHOTOGRAPHIC PAPER HAVING AN IMONGANIC COLLOIDAL OXIDE COATING. MAR. 13, 1973.

3,738,831.—CHALCOGEN ORGANIC COMPOUNDS USED IN ELECTROPHOTOGRAPHIC PLATES AND PROCESS. JUNE 12, 1973.

3,758,301.—ELECTROPHOTOGRAPHIC USE OF SELENIUM CONTAINING POLYMERS. SEPT. 11, 1973.

3,837,849.—MULTILAYERED VARIABLE SPEED PHOTORECEPTOR AND METHOD OF USING SAME. SEPT. 24, 1974. BEL. 0788302, CAN. 0978007, FRA. 7230830, GRB. 1401040, ITL. 0964409, SWD. 7211342.

3,850,630.—XEROGRAPHIC PLATE CONTAINING PHOTOINJECTING INDIGOLD PIGMENTS. NOV. 26, 1974. ARG. 0188393, AUS. 0465971, BEL. 0763391, CAN. 0932198, CHL. 0027129, EGR. 0093923, FRA. 7107566, GRB. 1337221, ITL. 0919106, MEX. 0122099, NZL. 0162890, PNM. 0002480, SAF. 0711226, SPN. 0388591, TIW. 0006740, USR. 0463276.

3,856,548.—STRIPPABLE OVERCOATING FOR IMPROVED XEROGRAPHIC PLATES. DEC. 24, 1974. GRB. 1426030.

3,860,421.—N-ALKYL MORPHOLINE TREATMENT OF A SELENIUM-CONTAINING PHOTOCONDUCTIVE LAYER. JAN. 14, 1975.

3,868,983.—HAND TOOL. MAR. 4, 1975.

3,877,935.—NOVEL XEROGRAPHIC PLATE CONTAINING PHOTOINJECTING POLYNUCLEAR QUINONE PIGMENTS. APR. 15, 1975. ARG. 0002614, AUS. 0452620, BEL. 0763389, CAN. 0932197, CHL. 0027120, FRA. 7107563, GRB. 1337224, GUA. 0002614, ITL. 0919103, MEX. 0122100, NZL. 0162887, PNM. 0002467, SAF. 0711223, SPN. 0388588, TIW. 0006741.

3,884,690.—POLYESTER PHOTOCONDUCTORS AND MATRIX MATERIALS. MAY 20, 1975.

3,896,184.—POLYMERS OF BENZANTHRACENE AS ACTIVE MATRIX MATERIALS. JULY 22, 1975.

3,900,589.—AN ELECTROSTATOGRAPHIC IMAGING PROCESS. AUG. 19, 1975. AUS. 0467835, BEL. 0802879, GRB. 1437041.

3,904,407.—XEROGRAPHIC PLATE CONTAINING PHOTOINJECTING PERYLENE PIGMENTS. SEPT. 9, 1975. ARG. 0189747, AUS. 0465811, BEL. 0763388, CAN. 0933010, CHL. 0026796, EGR. 0093458, FRA. 7107562, GRB. 1337225, GUA. 0002799, ITL. 0919102, MEX. 0126620, PNM. 0002468, SAF. 0711222, SPN. 0388587, SWD. 0362509, TIW. 0007210, USR. 0473381.

3,912,511.—MULTICOMPONENT ORGANIC COATING OF POLYESTER POLYURETHAND AND HUMIDITY. OCT. 14, 1975. ARG. 0182692, BEL. 0767325, CAN. 0938143, FRA. 7118948, GRB. 1350476, ITL. 0926822, MEX. 0121668.

3,954,464.—METHOD OF FABRICATING A COMPOSITE TRIGONAL SELENIUM PHOTORECEPTOR. MAY 4, 1976.

3,961,953.—METHOD OF FABRICATING COMPOSITES TRIGONAL SELENIUM PHOTORECEPTORS. JUNE 8, 1976.

3,973,843.—ELECTROSTATOGRAPHIC IMAGING APPARATUS. AUG. 10, 1976. AUS. 0467835, BEL. 0802879, GRB. 1437041.

Class 2B 3

3,510,660.—METHOD FOR VISUAL COMPARISON OF INFORMATION. MAY 5, 1970. CAN. 0848611, GRB. 1201376, JAP. 0595641.

3,543,031.—DEVICE AND PROCESS FOR IMAGE STORAGE. NOV. 24, 1970. ARG. 0161299, AUS. 0432468, BEL. 0703461, CAN. 0862332, FRA. 1543309, GER. 1549142, GRB. 1201374, ITL. 0811521, JAP. 0742514, MEX. 0100142, SPN. 0344004, STZ. 0497022, SWD. 0354169, VZL. 0023663.

Class 2B 4

3,428,453.—IMAGE FORMING PROCESS UTILIZING XEROGRAPHY-ETCHING PROCESS. FEB. 18, 1969. CAN. 0856722, FRA. 1428775, GRB. 1085151, ITL. 0754825.

3,446,616.—XEROGRAPHIC IMAGING EMPLOYING A SELECTIVELY REMOVABLE LAYER. MAY 27, 1969.

3,926,626.—CIRCULATION IMAGING METHOD. DEC. 16, 1975.

Class 2C

3,307,941.—PLASTIC DEFORMATION IMAGING FILM AND PROCESS. MAR. 7, 1967. CAN. 0801262.

3,317,316.—INTERNAL FROST RECORDING. MAY 2, 1967. ATR. 0272830, AUS. 0292886, BEL. 0648043, CAN. 0882890, FRA. 1399017, GER. 1243018, GRB. 1069741, ITL. 0725002, JAP. 0521009, LXB. 0046101, NOR. 0122729, STZ. 0469292, SWD. 0319083.

3,408,181.—HEAT DEFORMABLE RECORDING MATERIALS CONTAINING PHOTOCONDUCTIVE RESINOUS CHARGE TRANSFER COMPLE. OCT. 29, 1968. CAN. 0843620, FRA. 1463744, GER. 1522677, GRB. 1138552, ITL. 0755286, MEX. 0109927.

3,443,937.—IMAGE RESOLUTION. MAY 13, 1969. CAN. 0824316, GRB. 1137766, JAP. 0544235.

3,443,938.—FROST IMAGING EMPLOYING A DEFORMABLE ELECTRODE. MAY 13, 1969. CAN. 0801263, FRA. 1441806, GRB. 1073097, JAP. 0573732.

3,526,879.—INTERNAL FROST RECORDING APPARATUS USING A DEFORMABLE PHOTOCONDUCTOR. SEPT. 1, 1970.

3,672,883.—CRYSTALLINE POLYMERS FOR FROST. JUNE 27, 1972.

3,672,886.—NOVOLAR RESINS IN DEFORMATION IMAGING. JUNE 27, 1972.

3,707,391.—IMAGING PROCESS. DEC. 26, 1972.

3,892,567.—ELECTROSTATICALLY DEFORMABLE MATERIALS. JULY 1, 1975. ARG. 0196065, BEL. 0781973, CAN. 9814520, FRA. 7213876, GRB. 1394286, ITL. 0951328, MEX. 0124825.

Class 2C 2

3,873,197.—APPARATUS FOR REGULATING THE TONER CONCENTRATION IN A ELECTROPHOTOGRAPHIC DEVICE. MAR. 25, 1975.

Class 2D

3,411,903.—XEROGRAPHIC METHOD AND PLATE COMPRISING PHOTOCONDUCTIVE INSULATING FIBERS. NOV. 19, 1968. ARG. 0149620, ATR. 0270379, AUS. 0410718, BEL. 0672668, BRA. 0084119, CAN. 0834669, CHL. 0023648, CLB. 0014943, DNK. 0120577, EGR. 0055545, FRA. 1464792, GER. 1497224, GRB. 1084024, GRK. 0031509, IND. 0102560, ISR. 0024632, ITL. 0734376, JAP. 0724233, LXB. 0049849, MEX. 0098487, NOR. 0122817, NZL. 0143432, PLD. 0067959, PLP. 0004547, PNM. 0001533, PRU. 0008384, PTG. 0044879, SAF. 0656280, SPN. 0319795, STZ. 0458076, SWD. 0308250, THL. 1084024, TIW. 0003735, URG. 0006624, VZL. 0023996.

3,787,235.—METHOD OF ELECTROPHOTOGRAPHIC SENSITIVE PAPER. JAN. 22, 1974.
3,951,658.—COLOR MODIFYING IMAGING METHOD AND ARTICLE. APR. 20, 1976.

Class 2E

2,599,542.—ELECTROPHOTOGRAPHIC PLATE. JUNE 10, 1952.
2,657,152.—PROCESS OF PRODUCING AN ELECTROPHOTOGRAPHIC PLATE. OCT. 27, 1953. AUS. 0152887, CAN. 0516075, FRA. 1039677, GER. 0893010, GRB. 0687704, HOL. 0082956, SAF. 0012307, STZ. 0296692, SWD. 0148967.
2,662,832.—PROCESS OF PRODUCING AN ELECTROPHOTOGRAPHIC PLATE. DEC. 15, 1953.
2,663,636.—ELECTROPHOTOGRAPHIC PLATE AND METHOD OF PRODUCING SAME. DEC. 22, 1953. CAN. 0512461, GER. 0872427, GRB. 0693112, HOL. 0095533, SAF. 0012644, STZ. 0290324, SWD. 0148966.
3,341,681.—XEROGRAPHIC PLATE FABRICATION. SEPT. 12, 1967. CAN. 0780598, FRA. 1415795, GRB. 1070555, HOL. 0144068, IND. 0094992, ITL. 0738063.
3,350,203.—XEROGRAPHIC PLATE. OCT. 31, 1967. CAN. 0715017, FRA. 1421950, GER. 1270400, GRB. 1085989, ITL. 0750417, JAP. 0511420.
3,447,957.—METHOD OF MAKING A SMOOTH SURFACED ADHESIVE BINDER XEROGRAPHIC PLATE. JUNE 3, 1969. CAN. 0788947.
3,472,679.—COATING SURFACES. OCT. 14, 1969. CAN. 0896992.
3,536,397.—XEROGRAPHIC APPARATUS. OCT. 27, 1970. CAN. 0917231.
3,536,481.—ELECTROLYTIC PROCESS OF FORMING A XEROGRAPHIC BELT. OCT. 27, 1970. ARG. 0175659, AUS. 0416583, BEL. 0716410, CAN. 0865080, FRA. 1572605, GRB. 1200670, ITL. 0859021, MEX. 0103043, SWD. 0345698.
3,536,485.—XEROGRAPHIC PLATE SUPPORTED BY A MANDREL. OCT. 27, 1970.
3,578,445.—XEROGRAPHIC PLATE FABRICATION. MAY 11, 1971.
3,634,134.—METHOD OF MAKING A PHOTOCONDUCTIVE COMPOSITION AND DEVICE. JAN. 11, 1972. ARG. 0184074, ATR. 0307226, AUS. 449514, BEL. 0752440, CAN. 0904111, EGR. 0083703, FRA. 7023473, GRB. 1319342, ITL. 0894622, MEX. 0117839, PNM. 0002547, SPN. 0381111, STZ. 0548624, SWD. 0351734, TIW. 0007153.
3,695,757.—XEROGRAPHIC PLATE. OCT. 3, 1972.
3,746,571.—METHOD OF VACUUM EVAPORATION. JULY 17, 1973.
3,752,691.—METHOD OF VACUUM EVAPORATION. AUG. 14, 1973.
3,756,811.—ELECTROPHOTOGRAPHIC PROCESS EMPLOYING PHOTOCONDUCTIVE MATERIALS OF DIFFERENT DYNAMIC RANGES. SEPT. 4, 1973. CAN. 0894715, GRB. 1226578.
3,787,208.—XEROGRAPHIC IMAGE MEMBER HAVING PHOTOCONDUCTIVE MATERIAL IN INTERLOCKING CONTINUOUS PATHS. JAN. 22, 1974. ARG. 0186443, ATR. 0451252, BEL. 0763544, CAN. 0925741, CHL. 0026794, FRA. 7107567, GRB. 1296291, ITL. 0918909, MEX. 0122096, NZL. 0162891, PLP. 0009378, PNM. 0002396, SAF. 0711227, SPN. 0388639, STZ. 0568591, SWD. 0367259, TIW. 0007844, USR. 0398062.
3,788,889.—METHOD OF PREPARING BINDER LAYERS. JAN. 29, 1974.
3,837,906.—METHOD OF MAKING A XEROGRAPHIC BINDER LAYER AND LAYER SO PREPARED. SEPT. 24, 1974. ARG. 0186444, ATR. 0319750, AUS. 0448147, BEL. 0763392, CAN. 0939204, CHL. 0027098, FRA. 7107568, GRB. 1292425, ITL. 0918910, NZL. 0162892, PNM. 0002439, SAF. 0711228, SPN. 0388640, STZ. 0558554, SWD. 0036479, TIW. 0007713.
3,856,548.—STRIPPABLE OVERCOATING FOR IMPROVED XEROGRAPHIC PLATES. DEC. 24, 1974. GRB. 1426030.
3,894,868.—ELECTRON TRANSPORT BINDER STRUCTURE. JULY 15, 1975. AUS. 0461951, BEL. 0763543, CAN. 0932196, CHL. 0026795, EGR. 0096346, FRA. 7107561, GRB. 1337226, GUA. 0002467, ITL. 0919110, MEX. 0120807, NZL. 0162885, PNM. 0002481, SAF. 0711221, SPN. 0388586, TIW. 0007182, USR. 0444380.
3,911,091.—MILLING TRIGONAL SELENIUM PARTICLES TO IMPROVED XEROGRAPHIC PERFORMANCE. OCT. 7, 1975.
3,926,762.—R F SPUTTERING OF TRIGONAL SELENIUM FILM. DEC. 16, 1975.
3,944,682.—METHOD OF PROVIDING AN ELECTROPHOTOGRAPHIC COATING AND COMPOSITIONS FOR METHOD. MAR. 16, 1976.
3,945,723.—RESILIENT ROLLERS. MAR. 23, 1976. ARG. 0205448.
3,954,466.—ELECTROSTATOGRAPHIC PHOTORECEPTOR. MAY 4, 1976.

Class 2E 1E 2

3,468,705.—METHOD OF PREPARING LEAD OXIDE FILMS. SEPT. 23, 1969. CAN. 0806134, FRA. 1501511, GER. 1521942, GRB. 1170428, ITL. 0787638, JAP. 0634868, MEX. 0093335.

Class 2F

2,619,418.—XEROGRAPHIC PLATE HOLDER. NOV. 25, 1952.
3,143,044.—XEROGRAPHIC PLATE HOLDER. AUG. 4, 1964.
3,592,071.—BELT TRACKING APPARATUS. JULY 13, 1971. ARG. 0179666, BEL. 0751117, CAN. 0925118, FRA. 7019040, GRB. 1298926, ITL. 0893540, JAP. 0770135, MEX. 0118981, SPN. 0380136.
3,765,757.—TRANSPORT ARRANGEMENT FOR THIN SHEET MATERIAL. OCT. 16, 1973. BEL. 0793551, GRB. 1419978, ITL. 0972846, SPN. 0410107.
3,820,888.—MISTRACK INTERLOCK FOR SELENIUM BELT. JUNE 28, 1974.
3,874,790.—FAIL-SAF MECH STPNG MVMNT PHTCNDCTV BLT ELTRSTC REPRDCTN MACH WHEN TRCKNG BECOMES IREGULAR AND UN. APR. 1, 1975.
3,888,577.—APPARATUS FOR PACKAGING AND SUBSEQUENTLY INSTALLING A BELT ONTO A ROLLER ASSEMBLY. JUNE 10, 1975. BEL. 0810900.

Class 3

3,935,517.—CONSTANT CURRENT CHARGING DEVICE. JAN. 27, 1976.

Class 3A

2,833,648.—TRANSFER OF ELECTROSTATIC CHARGE PATTERN. MAY 6, 1958. BEL. 0530462, FRA. 1110794, GER. 1063899, GRB. 0773604, HOL. 0130249, JAP. 0238843, STZ. 0330512.
2,833,930.—ELECTROSTATIC CHARGING METHOD AND APPARATUS. MAY 6, 1958. CAN. 0564954.
2,934,649.—INDUCTION CHARGING. APR. 26, 1960. CAN. 0616346.
3,172,024.—CHARGE INDUCTION. MAR. 2, 1965. CAN. 0809341, FRA. 1294161, GER. 1414991, GRB. 0958663, JAP. 0455338.
3,254,998.—INDUCTION IMAGE FORMATION. JUNE 7, 1966. CAN. 0740576, FRA. 1357220, GER. 1276445, GRB. 1024985, JAP. 0451689.
3,288,602.—XEROGRAPHIC PLATE AND METHOD. NOV. 29, 1966. CAN. 0795978, GER. 1237902, GRB. 1029181, ITL. 0690835, JAP. 0578399.
3,684,364.—LIFTOFF ELECTRODE. AUG. 15, 1972.
3,842,273.—CORONA GENERATOR CLEANING APPARATUS. OCT. 15, 1974. BEL. 0817485.

Class 3A 2

3,884,181.—CAPILLARY BAFFLE-CONSTANT OIL HEIGHT INDEPENDENT TO OIL LEVEL. MAY 20, 1975.
3,893,800.—BACKSIDE HEATING AND FIXING APP IN AN ELECTRONIC PHOTOGRAPH DUPLICATOR. JULY 8, 1975.
3,957,423.—STRIPPER FINGER DESIGN. MAY 18, 1976.

Class 3B

2,912,586.—XEROGRAPHIC CHARGING. NOV. 10, 1959.
3,160,746.—CORONA CHARGING APPARATUS FOR NONUNIFORMLY CHARGING A XEROGRAPHIC PLATE IN A PREDETERMINED MAN. DEC. 8, 1964. GER. 1197475, GRB. 1011793, JAP. 0484759.
3,288,602.—XEROGRAPHIC PLATE AND METHOD. NOV. 29, 1966. CAN. 0795978, GER. 1237902, GRB. 1029181, ITL. 0690835, JAP. 0578399.
3,449,568.—CORONA DISCHARGE APPARATUS FOR CREATING AN ELECTROSTATIC CHARGE PATTERN ON A XEROGRAPHIC SURFAC. JUNE 10, 1969. CAN. 0858664.

3,532,494.—SOLID AREA DEVELOPMENT IN XEROGRAPHY EMPLOYING AN INSULATING SCREEN IN THE CHARGING STEP. OCT. 6, 1970.
3,543,022.—METH AND APPARATUS CHARG DISCRETE SMALL AREAS XEROGRAPHIC PLATES TO DIF POTENT CONT TONE PRINTG. NOV. 24, 1970. CAN. 0921971, GRB. 1186599.
3,784,299.—DARK DECAY RETARDATION. JAN. 8, 1974.

Class 3C

2,543,051.—METHOD OF CHARGING AND EXPOSING ELECTROPHOTOGRAPHIC PLATES. FEB. 27, 1951.
2,705,675.—PLATE CHARGING CIRCUIT FOR ELECTROPHOTOGRAPHY. APR. 5, 1955.
2,741,959.—ELECTROPHOTOGRAPHY. APR. 17, 1956. CAN. 0533763.
2,836,725.—CORONA CHARGING DEVICE. MAY 27, 1958. CAN. 0571450, FRA. 1188606, GER. 1787078, GRB. 0826088.
2,868,989.—ELECTROSTATIC CHARGING METHOD AND DEVICE. JAN. 13, 1959. CAN. 0584243.
2,965,756.—ELECTROSTATIC CHARGING APPARATUS. DEC. 20, 1960.
3,017,509.—XEROGRAPHIC PLATE FEEDING AND CHARGING APPARATUS. JAN. 16, 1962.
3,122,634.—CONTROLLED CHARGING IN XEROGRAPHIC COPYING APPARATUS. FEB. 25, 1964. CAN. 0706543, FRA. 1352624, GER. 1210323, GRB. 1026262, JAP. 0446815.
3,160,746.—CORONA CHARGING APPARATUS FOR NONUNIFORMLY CHARGING A XEROGRAPHIC PLATE IN A PREDETERMINED MAN. DEC. 8, 1964. GER. 1197475, GRB. 1011793, JAP. 0484759.
3,335,274.—XIC CHARGING APPARATUS WITH MEANS TO AUTOMATICALLY CONTROL THE POT ENTAIL APPLIED TO THE CORONA. AUG. 8, 1967. CAN. 0801834, FRA. 1459487, GRB. 1121498, ITL. 0734870, MEX. 0085777.
3,382,360.—XIC CHARGING SYSTEM HAVING MEANS FOR PROVIDING AN AIR CUSHION BETWEEN CHARGING DEVICE AND XIC DR. MAY 7, 1968.
3,457,405.—CORONA WIRE MOUNTING MEANS WHICH COMPENSATES FOR WIRE EXPANSION DUE TO HEAT. JULY 22, 1969. CAN. 0857406, GRB. 1196927.
3,471,695.—CORONA CHGNG APPTS W/MEANS TO URGE A FLOW OF AERIFORM FLUID ACROSS THE CORONA WIRES. OCT. 7, 1969. CAN. 0856355, GRB. 1220745.
3,483,372.—CORONA CHARGING DEVICE WITH CONDUCTIVE SHIELD AND INSULATING MEANS ON SAID SHIELD. DEC. 9, 1969. CAN. 0840508, GRB. 1169632, JAP. 0770817.
3,517,995.—METHOD AND APPARATUS FOR INCREASING THE EFFICIENCY OF CORONA CHARGNG. JUNE 30, 1970. ARG. 0172471, BEL. 0721553, CAN. 0856714, FRA. 1585283, GRB. 1247034, ITL. 0844214, JAP. 0708414, MEX. 0103113, VZL. 0023701.
3,566,108.—CORONA GENERATING ELECTRODE STRUCTURE FOR USE IN A XEROGRAPHIC CHARGING METHOD. FEB. 23, 1971.
3,598,991.—ELCTRSTC CHRGNG DEV HAVNG SPRK GAP VOLTG REGULTR BETWEEN A CORONA SOURCE AND VOLTG SOURCE. AUG. 10, 1971. AUS. 0457211, BEL. 0754426, CAN. 0916233, CZC. 0163219, EGR. 0084558, FRA. 7029148, GRB. 1322378, ITL. 0901159, JAP. 0715800, PLD. 0070053, SPN. 0382404, STZ. 0513436, SWD. 0359663, TIW. 0007173, USR. 0442617.
3,604,925.—APPARATUS FOR CONTROLLING THE AMOUNT OF CHARGE APPLIED TO SURFACE. SEPT. 14, 1971.
3,612,864.—IMAGING SYSTEM UTILIZING AN ELECTRODE TREATED W/MIXTURE OF HYDROSCOPIC MATERIAL AND HYDROPHILIC B. OCT. 21, 1971.
3,675,011.—METHODS AND APPARATUS FOR OPERATING RAISED COROTRONS OF OPPOSITE POLARITY. JULY 4, 1972.
3,723,793.—COATED CORONA GENERATING ELECTRODE. MAR. 27, 1973.
3,742,237.—AC CORONA CHARGING APPARATUS. JUNE 26, 1973. CAN. 0955299, GRB. 1387209.
3,760,229.—A C COROTRON. SEPT. 18, 1973. GRB. 1410671.
3,769,506.—CORONA GENERATING METHOD AND APPARATUS THEREFOR. OCT. 30, 1973.
3,790,999.—CORONA WIRE APPARATUS. FEB. 12, 1974.
3,800,153.—ELECTROPHOTOGRAPHY CHARGING DEVICE. MAR. 26, 1974.
3,813,547.—CORONA GENERATING APPARATUS. MAY 28, 1974.
3,813,548.—CORONA GENERATING METHODS AND APPARATUS THEREFOR. MAY 28, 1974.
3,816,749.—EXPOSURE CONTROLLED CORONA DEVICE. JUNE 11, 1974.
3,851,229.—CURRENT MEASURING DEVICE. NOV. 26, 1974.
3,870,883.—ELECTROSTATIC PRINTING MACHINE WITH SELF-CLEANING CORONAL GENERATING DEVICE. MAR. 11, 1975.
3,901,189.—MAGNETIC BRUSH DEVELOPING APPARATUS. AUG. 26, 1975.
3,919,605.—CORONA DISCHARGE APPARATUS. NOV. 11, 1975.
3,922,548.—CORONA CHARGING DEVICE AND SUPPORT ARRANGEMENT. NOV. 25, 1975.
3,937,960.—CHARGING DEVICE FOR ELECTROPHOTOGRAPHY. FEB. 10, 1976.
3,939,386.—TECHNIQUE FOR CHARGING DIELECTRIC SURFACES TO HIGH VOLTAGE. FEB. 17, 1976.

Class 3C 1

2,790,082.—XEROGRAPHIC CHARGING DEVICE. APR. 23, 1957.
2,879,395.—CHARGING DEVICE. MAR. 24, 1959. CAN. 0604246.
2,885,556.—SIMULTANEOUS CHARGING DEVICE AND METHOD. MAY 5, 1959. CAN. 0638188.
2,932,742.—XEROGRAPHIC CHARGING DEVICE AND METHOD. APR. 12, 1960. CAN. 0606202, FRA. 1150711, GER. 1099848, GRB. 0822555.
2,965,481.—ELECTROSTATIC CHARGING AND IMAGE FORMATION. DEC. 20, 1960. CAN. 0746571.
3,076,092.—XEROGRAPHIC CHARGING APPARATUS. JAN. 29, 1963.
3,275,837.—XEROGRAPHIC CHARGING APPARATUS. SEPT. 27, 1966. ARG. 0158430, ATR. 0242511, AUS. 0276177, BEL. 0642095, CAN. 0753356, FRA. 1385736, GER. 1488286, GRB. 1040264, ITL. 0712888, JAP. 0477814, MEX. 0075819, STZ. 0460930, SWD. 0314133.
3,307,034.—TWO-WIRE CORONA DISCHARGE SYSTEM FOR SINGLE-STEP ELECTROSTATIC IMAGE FORMATION. FEB. 28, 1967. CAN. 0768802, FRA. 1416275, GER. 1275864, GRB. 1055416, ITL. 0744235, JAP. 0491997.
3,492,476.—ELECTROSTATIC CHARGING DEVICE UTILIZING BOTH AC AND DC FIELDS. JAN. 27, 1970. ARG. 0175174, ATR. 0300573, AUS. 0425768, BEL. 0729976, CAN. 0862232, CHL. 0024600, CZC. 0158639, DNK. 0126728, EGR. 0081574, EIR. 0032976, FRA. 6907701, GRB. 1255998, GRK. 0039915, IND. 0120218, ISR. 0031765, ITL. 0860063, LXB. 0058234, MEX. 0108894, NOR. 0129709, NZL. 0155636, PAK. 0120995, PLD. 0017649, PLP. 0007523, PNM. 0001813, PTG. 0051315, RHD. 1096947, RMN. 0055216, SAF. 0691730, SPN. 0364888, STZ. 0493014, SWD. 0341528, UAR. 0009212, USR. 0318248, VTM. 0001845, VZL. 0023731.
3,873,895.—TECHNIQUE FOR CHARGING DIELECTRIC SURFACES TO HIGH VOLTAGE. MAR. 25, 1975.
3,886,416.—METHOD AND APPARATUS FOR ADJUSTING COROTRON CURRENTS. MAY 27, 1975.
3,908,164.—CORONA CURRENT MEASUREMENT AND CONTROL ARRANGEMENT. SEPT. 23, 1975.
3,961,193.—SELF ADJUSTING CORONA DEVICE. JUNE 1, 1976.

Class 3C 2

2,856,533.—MOVING WIRE CORONA. OCT. 14, 1958.
3,304,476.—TRANSFER SWITCH FOR A XEROGRAPHIC APPARATUS. FEB. 14, 1967.
3,433,948.—NEGATIVE CORONA DISCHARGE SYSTEM USING ALTERNATING ELECTRIC FIELDS ACROSS THE AIR GAP. MAR. 18, 1969. CAN. 0855811, FRA. 1564157, GRB. 1211442, ITL. 0829718, JAP. 0655407.
3,541,329.—NEGATIVE CORONA DEVICE WITH MEANS FOR PRODUCING A REPELLING ELECTROSTATIC FIELD. NOV. 17, 1970. CAN. 0841136, FRA. 1546256, GRB. 1205040, JAP. 0634886.

Class 3C 3

2,774,921.—APPARATUS FOR ELECTROSTATICALLY CHARGING INSULATING IMAGE SURFACES FOR ELECTROPHOTOGRAPHY. DEC. 18, 1956.
2,934,650.—CHARGING APPARATUS. APR. 26, 1960. CAN. 0596221.
3,146,385.—XEROGRAPHIC PLATE CHARGING METHOD AND APPARATUS. AUG. 25, 1964. GRB. 1013924.

3,649,830.—UNIFORM CHARGING METHOD AND APPARATUS USING AN ARRAY OF NEEDLE ELECTRODES. MAR. 14, 1972.
3,655,966.—ELECTRIC CHARGING DEVICE FOR ELECTROPHOTOGRAPHY. APR. 11, 1972.
3,689,767.—METHOD AND APPARATUS FOR UNIFORMLY CHARGING THE SURFACE OF AN INSULATING MEMBER. SEPT. 5, 1972.
3,709,595.—PRINTER SYSTEM. JAN. 9, 1973.

Class 3C 4

2,777,957.—CORONA DISCHARGE DEVICE. JAN. 15, 1957. AUS. 0153841, CAN. 0558592, FRA. 1041698, GER. 0924420, GRB. 0696515, PNM. 0001841, SAF. 0012801, STZ. 0296687, SWD. 0159714.
2,778,946.—CORONA DISCHARGE DEVICE AND METHOD OF XEROGRAPHIC CHARGING. JAN. 22, 1957. CAN. 0558259.
2,965,754.—DOUBLE SCREEN CORONA DEVICE. DEC. 20, 1960. CAN. 0622926.
3,062,956.—XEROGRAPHIC CHARGING APPARATUS SCOROTRON CONTROL CIRCUIT - PHILCO PRINTER PROCESSOR. JUNE 11, 1962. CAN. 0686702.
3,068,356.—XEROGRAPHIC CHARGING APPARATUS. DEC. 11, 1962. CAN. 0681400, GER. 1214996, GRB. 0990114.
3,220,324.—PHOTOCONDUCTIVELY CONTROLLED CORONA CHARGING. NOV. 30, 1965. CAN. 0710976, GER. 1243967, GRB. 1034009, JAP. 0651092.
3,307,034.—TWO-WIRE CORONA DISCHARGE SYSTEM FOR SINGLE-STEP ELECTROSTATIC IMAGE FORMATION. FEB. 28, 1967. CAN. 0768802, FRA. 1416275, GER. 1275864, GRB. 1055416, ITL. 0744235, JAP. 0491997.
3,492,476.—ELECTROSTATIC CHARGING DEVICE UTILIZING BOTH AC AND DC FIELDS. JAN. 27, 1970. ARG. 0175174, ATR. 0300573, AUS. 0425768, BEL. 0729976, CAN. 0862232, CHL. 0024600, CZC. 0158639, DNK. 0126728, EGR. 0081574, EIR. 0032976, FRA. 6907701, GRB. 1255998, GRK. 0039915, IND. 0120218, ISR. 0031765, ITL. 0860063, LXB. 0058234, MEX. 0108894, NOR. 0129709, NZL. 0155636, PAK. 0120995, PLD. 0017649, PLP. 0007523, PNM. 0001813, PTG. 0051315, RHD. 1096947, RMN. 0055216, SAF. 0691730, SPN. 0364888, STZ. 0493014, SWD. 0341528, UAR. 0009212, USR. 0318248, VTM. 0001845, VZL. 0023731.
3,496,351.—CORONA CONTROL CIRCUIT FOR STEPPING XEROGRAPHIC RECORDNG APPARATUS. FEB. 17, 1970. CAN. 0834978, FRA. 1512919, GRB. 1170472, ITL. 0793742, JAP. 0923309.
3,688,107.—ELECTROSTATOGRAPHIC CHARGING APPARATUS. AUG. 29, 1972. CAN. 0938660, GRB. 1365130.
3,875,407.—CORONA GENERATOR CLEANING APPARATUS. APR. 1, 1975.
3,908,127.—CORONA GENERATING DEVICES. SEPT. 23, 1975.
3,909,614.—SCOROTRON POWER SUPPLY CIRCUIT. SEPT. 30, 1975.
3,936,635.—CORONA GENERATING DEVICE. FEB. 3, 1976.

Class 3C 5

2,885,556.—SIMULTANEOUS CHARGING DEVICE AND METHOD. MAY 5, 1959. CAN. 0638188.
2,965,481.—ELECTROSTATIC CHARGING AND IMAGE FORMATION. DEC. 20, 1960. CAN. 0746571.
3,970,381.—METHOD AND APPARATUS FOR XEROGRAPHIC REPRODUCTION. JULY 20, 1976. BEL. 0811188.

Class 3C 6

2,701,764.—ELECTROPHOTOGRAPHIC APPARATUS AND METHODS. FEB. 8, 1955.
3,549,962.—UNIFORM ELECTROSTATIC CHARGING. DEC. 22, 1970. CAN. 0897757, GRB. 1189578.
3,648,133.—UNIFORM ELECTROSTATIC CHARGING OF A PHOTOCONDUCTIVE INSULATING SURFACE. MAR. 7, 1972.
3,743,830.—DEVICE FOR UNIFORMLY CHARGING A NON PLANAR ELECTROPHOTOGRAPHIC PLATE. JULY 3, 1973.
3,764,866.—CORONA GENERATOR. OCT. 9, 1973. ARG. 0198185, ATR. 0325420, AUS. 0467386, BEL. 0793227, CZC. 0168018, DNK. 0131699, FRA. 7245484, GRB. 1402739, ITL. 0972692, MEX. 0128581, NZL. 0169420, PTG. 0058386, SAF. 0729029, STZ. 0553435, SWD. 7216596.
3,792,913.—XEROGRAPHIC ERASE MECHANISM. FEB. 19, 1974. GRB. 1422175.
3,811,048.—ELECTROPHOTOGRAPHIC CHARGING APPARATUS. MAY 14, 1974.
3,967,119.—CORONA CHARGING DEVICE. JUNE 29, 1976.
3,967,891.—IMAGING SYSTEM FOR ELECTROSTATIC REPRODUCTION MACHINE. JULY 6, 1976.

Class 3C 7

3,323,373.—ESCAPEMENT MECHANISM. JUNE 6, 1967. CAN. 0841310.
3,324,291.—CORONA GENERATING DEVICE W/MEANS TO CAUSE AIR FLOW THERE-THROUGH TO MAINTN PARTS FREE OF DUST. JUNE 6, 1967. CAN. 0794904, GRB. 1070615, JAP. 0512648.
3,339,069.—CORONA CHARGING DEVICE W/MEANS TO PREVENT TONER DUST CONTAMINATION. AUG. 29, 1967. CAN. 0788539, FRA. 1450010, GRB. 1116687, ITL. 0730715, JAP. 0875339, MEX. 0089459.
3,496,352.—SELF-CLEANING CORONA GENERATING APPARATUS. FEB. 17, 1970. CAN. 0856356, GRB. 1227987, JAP. 0641478.
3,743,540.—SURFACE CLEANING BY IONIZED FLOW. JULY 3, 1973.
3,794,839.—CORONA GENERATING APPARATUS. FEB. 26, 1974. GRB. 1434863.
3,942,006.—CORONA GENERATOR CLEANING APPARATUS. MAR. 2, 1976.
3,965,400.—CORONA GENERATING DEVICE WITH IMPROVED BUILT IN CLEANING MECHANISM. JUNE 22, 1976.

Class 3C 8

3,335,273.—XIC CHARGING APPARATUS W/MEANS TO TERMINATE CHARGING CYCLE WHEN A PREDETERMINED CHARGE IS OBTAI. AUG. 8, 1967. CAN. 0794905, FRA. 1462556, GRB. 1128618, ITL. 0743940, JAP. 0632530, MEX. 0087314.
3,335,275.—XIC CHARGNG APPTS W/ADJSTBL MEANS TO TERMINATE CHRGNG CYCLE WHEN PREDETERMINED CHARGE IS OBTAI. AUG. 8, 1967. CAN. 0801833.
3,667,036.—ELECTROMETER AMPLIFIER CIRCUITS. MAY 30, 1972.
3,678,350.—ELECTRIC CHARGING METHOD. JULY 18, 1972.
3,805,069.—REGULATED CORONA GENERATOR. APR. 16, 1974.
3,934,141.—APPARATUS FOR AUTOMATICALLY REGULATING THE AMOUNT OF CHARGE APPLIED TO AN INSULATING SURFACE. JAN. 20, 1976.
3,944,356.—A CHARGING APPARATUS. MAR. 16, 1976.
2,934,650.—CHARGING APPARATUS. APR. 26, 1960. CAN. 0596221.
3,557,367.—METHOD AND APPARATUS FOR INCREASING THE EFFICIENCY OF CORONA CHARGING OF A PHOTOCONDUCTOR. JAN. 19, 1971. ARG. 0170822, BEL. 0720017, BRA. 6800368, CAN. 0879279, FRA. 1597512, GRB. 1244378, ITL. 0840366, JAP. 0628391, MEX. 0105427, VZL. 0023699.
3,582,731.—CHARGING SYSTEM. JUNE 1, 1971. CAN. 0906045.
3,765,026.—ELECTROGRAPHIC RECORDING SYSTEM. OCT. 9, 1973. CAN. 0948272, GRB. 1365346.

Class 3D

2,987,660.—XEROGRAPHIC CHARGING. JUNE 6, 1961.
3,394,002.—CHARGE TRANSFER WITH LIQUID LAYERS. JULY 23, 1968. CAN. 0840028, GRB. 1126048, JAP. 0524527.
3,398,336.—ELECTRICAL CHARGING UTILIZING TWO PHASE LIQUID MEDIUM. AUG. 20, 1968. CAN. 0815738, GRB. 1149074, JAP. 0562387.
3,687,106.—DONOR APPARATUS AND METHOD. AUG. 29, 1972. ARG. 0185079, BEL. 0753207, CAN. 0911706, FRA. 7027124, GRB. 1314862, ITL. 0900444, JAP. 0733285, MEX. 0117318, PNM. 0002237, VZL. 0027517.
3,907,559.—IMGNG PRCS EMPLYNG FRCTN CHRGNG IN THE PRESENCE OF AN ELECTRICALLY INSULATING DEVELOPER LIQUID. SEPT. 23, 1975.

Class 3E

3,172,024.—CHARGE INDUCTION. MAR. 2, 1965. CAN. 0809341, FRA. 1294161, GER. 1414991, GRB. 0958663, JAP. 0455338.

3,254,998.—INDUCTION IMAGE FORMATION. JUNE 7, 1966. CAN. 0740576, FRA. 1357220, GER. 1276445, GRB. 1024985, JAP. 0451689.

Class 3F

2,833,648.—TRANSFER OF ELECTROSTATIC CHARGE PATTERN. MAY 6, 1958. BEL. 0530462, FRA. 1110794, GER. 1063899, GRB. 0773604, HOL. 0130249, JAP. 0238843, STZ. 0330512.
2,833,930.—ELECTROSTATIC CHARGING METHOD AND APPARATUS. MAY 6, 1958. CAN. 0564954.
2,955,938.—XEROGRAPHY - CHARGING PHOTOCONDUCTOR IN INSULATING. OCT. 11, 1960. CAN. 0603124.
3,307,034.—TWO-WIRE CORONA DISCHARGE SYSTEM FOR SINGLE-STEP ELECTROSTATIC IMAGE FORMATION. FEB. 28, 1967. CAN. 0768802, FRA. 1416275, GER. 1275864, GRB. 1055416, ITL. 0744235, JAP. 0491997.
3,453,427.—ELEC LAMP FOR UNIFRMLY CHRGNG THE PHOTOCNDCTIVE INSULATNG LAYER OF A XEROGRAPHIC PLATE. JULY 1, 1969.
3,481,669.—PHOTO-CHARGING OF XEROGRAPHIC PLATES. DEC. 2, 1969. AUS. 0420860, BEL. 0705167, CAN. 0814631, FRA. 1541297, GER. 1522683, GRB. 1088073, JAP. 0517512.
3,687,538.—APPARATUS FOR EXPOSING LATENT IMAGE MARGINS IN ELECTROPHOTOGRAPHIC COPYING APPARATUS. AUG. 29, 1972.
3,751,155.—PRE-DEVELOPMENT EXPOSURE ASSEMBLY. AUG. 7, 1973.
3,809,472.—PRE-DEVELOPMENT EXPOSURE ASSEMBLY. MAY 7, 1974. ARG. 0196103, AUS. 0466757, BEL. 0793559, CHL. 0027991, FRA. 7246234, GRB. 1415170, ITL. 0973319, JAP. 0552841, MEX. 0131207, NZL. 0169421, PRU. 0013334, PTG. 0058769, SAF. 0729132, SPN. 0410172, STZ. 0552841, SWD. 7216970.
3,845,307.—COMBINED CORONA AND LUMINESCENT DISCHARGE. OCT. 29, 1974. BEL. 0811310, GRB. 1433663.
3,860,338.—ADJUSTABLE FADEOUT. JAN. 14, 1975. BEL. 0809655.
3,893,419.—BACKGROUND REDUCTION TECHNIQUE. JULY 8, 1975.

Class 4A

3,811,764.—APPARATUS FOR PHOTOELECTROPHORETIC IMAGING USING A PERIODIC ELECTRIC FIELD. MAY 21, 1974.

Class 4A 1

2,781,704.—XEROGRAPHIC COPIER CAMERA UNIT. FEB. 19, 1957. CAN. 0581458.
2,808,023.—APPARATUS FOR DEVELOPING ELECTROSTATIC LATENT IMAGE. OCT. 1, 1957.
2,812,883.—ELECTROPHOTOGRAPHIC DEVELOPING POWDER CLOUD GENERATING PROCESS AND APPARATUS. NOV. 12, 1957.
3,330,180.—ILLUMINATION CONTROL SYSTEM. JULY 11, 1967. ARG. 0151653, BRA. 0084295, CAN. 0785137, FRA. 1450157, GER. 1264239, GRB. 1122629, ITL. 0730678, JAP. 0508404, MEX. 0078870.
3,432,231.—EXPOSURE CONTROL DEVICE. MAR. 11, 1969.
3,432,232.—ILLUMINATION SYSTEM. MAR. 11, 1969. CAN. 0846423, JAP. 0534763.
3,487,252.—CESIUM LIGHT SOURCE. DEC. 30, 1969.
3,504,969.—IMAGING APPARATUS. APR. 7, 1970.
3,512,886.—DUAL CARRIAGE SCANNING SYS. MAY 19, 1970. CAN. 0875712, GRB. 1235136.
3,586,849.—ILLUMINATION SYSTEM. JUNE 22, 1971. ARG. 0183139, ATR. 0303522, AUS. 0428629, BEL. 0733400, BRA. 6908480, CAN. 0903730, CHL. 0024870, FRA. 6917011, GRB. 1260688, ITL. 0864185, MEX. 0111515, NOR. 0125954, NZL. 0156507, PNM. 0001430, PRU. 0010320, PTG. 0051752, SAF. 0693689, SPN. 0367616, STZ. 0758269, SWD. 0354924, VZL. 0025067.
3,622,217.—LIGHT PRODUCING SYSTEM. NOV. 23, 1971.
3,733,599.—TRIGGERING APPARATUS FOR A FLASH LAMP. MAY 15, 1973. CAN. 0937281, GRB. 1361073.
3,746,442.—ELECTROPHOTOGRAPHIC IMAGING APPARATUS. JULY 17, 1973.
3,767,956.—APERTURE FLUORESCENT LAMP FOR COPYING MACHINES. OCT. 23, 1973.
3,777,135.—ILLUMINATION SYSTEM. DEC. 4, 1973.
3,779,640.—HEATING APPARATUS FOR SCAN LAMP. DEC. 18, 1973. ITL. 0995677.
3,781,585.—LIGHT PRODUCING SYSTEM. DEC. 25, 1973.
3,824,013.—LIGHT SOURCE ALIGNMENT DEVICE. JULY 16, 1974.
3,851,201.—LAMP ASSEMBLY. NOV. 26, 1974.
3,868,182.—LAMP ASSEMBLY. FEB. 25, 1975.
3,869,205.—ILLUMINATION SOURCE FOR XEROGRAPHIC EXPOSURE. MAR. 4, 1975.
3,881,817.—OPTICAL ALIGNMENT SYSTEM FOR AN ORIGINAL DOCUMENT. MAY 6, 1975. CAN. 3881817.
3,893,754.—COMBINATION PARABOLOID-ELLIPSOID MIRROR SYSTEM. JULY 8, 1975.
3,904,290.—OPTICAL SYSTEM ALIGNMENT APPARATUS. SEPT. 9, 1975.
3,909,254.—LASER RECORDING METHOD. SEPT. 30, 1975.
3,914,649.—PULSED METAL OR METAL HALIDE LAMPS FOR PHOTOCOPYING APPLICATIONS. OCT. 21, 1975.
3,961,222.—SODIUM VAPOR LAMP CONFIGURATION. JUNE 1, 1976.
3,967,893.—AN ILLUMINATING APPARATUS. JULY 6, 1976.

Class 4A 2

2,738,705.—FILE-HOLDING DEVICE FOR CAMERA COPY SUPPORT. MAR. 20, 1956.
2,758,503.—COPY-HOLDING APPARATUS. AUG. 14, 1956.
3,381,573.—SCANNING ATTACHMENT. MAY 7, 1968. CAN. 0820036, GER. 1945460, GRB. 1134645, JAP. 0524529.
3,524,704.—MULTI-LENGTH DOCUMENT RECORDING APPARATUS. AUG. 18, 1970.
3,888,581.—SEMI-AUTOMATIC DOCUMENT HANDLER. JUNE 10, 1975.
3,888,582.—SEMI-AUTOMATIC DOCUMENT HANDLER. JUNE 10, 1975.
3,888,584.—SEMI-AUTOMATIC DOCUMENT HANDLER. JUNE 10, 1975.
3,888,585.—SEMI-AUTOMATIC DOCUMENT HANDLER. JUNE 10, 1975.
3,901,594.—SEMI-AUTOMATIC DOCUMENT HANDLER. AUG. 26, 1975.
3,930,724.—MASKING APPARATUS FOR A MULTI-COLOR ELECTROPHOTOGRAPHIC PRINTING MACHINE. JAN. 6, 1976.

Class 4A 2A

3,062,110.—EXPOSURE STATION APPARATUS. NOV. 6, 1962. CAN. 0701636, JAP. 0318676.
3,560,089.—PLATEN COVER. FEB. 2, 1971. BEL. 0736415, CAN. 0910104, FRA. 0024759, GRB. 1245543, ITL. 8691460, JAP. 0674392.
3,560,090.—PLATEN COVER. FEB. 2, 1971. CAN. 0910103.
3,615,134.—COUNTERBALANCED AND SELF-CLOSING PLATEN COVER. OCT. 26, 1971. ARG. 0185533, AUS. 0449673, BEL. 0756482, CAN. 0921744, CHL. 0025836, EGR. 0084323, FRA. 7035445, GRB. 1318753, GUA. 0002610, ITL. 0908279, MEX. 0116804, PLD. P143518, PNM. 0002181, SPN. 0384046, STZ. 0515525, TIW. 0006830, USR. 0439097.
3,642,371.—PLATEN COVER FOR COPYING MACHINE. FEB. 15, 1972. ARG. 0189873, BEL. 0768991, CAN. 0938485, FRA. 7124554, ITL. 0932443.
3,642,376.—REMOVABLE PLATEN COVER. FEB. 15, 1972. CAN. 0926919.
3,685,905.—COMBINED DOCUMENT FEED AND BOOK COPYING APPARATUS. AUG. 22, 1972. ARG. 0189167, BEL. 0782370, CAN. 0954579, FRA. 7214327, GRB. 1382646, ITL. 0959701, MEX. 0127002, VZL. 30688.
3,788,737.—LUMINESCENT COVER. JAN. 29, 1974. FRA. 7336535.
3,860,338.—ADJUSTABLE FADEOUT. JAN. 14, 1975. BEL. 0809655.
3,914,043.—COLOR ACCENTING COPYING MACHINE. OCT. 21, 1975.
3,914,049.—OPTICAL SCANNING SYSTEM. OCT. 21, 1975. BEL. 0815416.
3,930,466.—SEGMENTED GATE DEVELOPER FLOW CONTROLLER. JAN. 6, 1976.
3,936,172.—LIQUID CRYSTALLINE PLATEN FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. FEB. 3, 1976.

Class 4A 3

3,432,232.—ILLUMINATION SYSTEM. MAR. 11, 1969. CAN. 0846423, JAP. 0534763.
3,600,610.—TIME DELAY CIRCUIT FOR A RADIANT ENERGY PROTECTIVE APPARATUS. AUG. 17, 1971.
3,672,759.—ILLUMINATION CONTROL SYSTEM. JUNE 27, 1972.

3,775,008.—OPTICAL SCANNING APPARATUS. NOV. 27, 1973.
3,829,209.—IMAGE REGISTRATION IN A MULTIPLE MAGNIFICATION PHOTOCOPY INH SYSTEM. AUG. 13, 1974. ARG. 0194481, BEL. 0784522, CAN. 0988146, FRA. 7220688, GRB. 1397446, ITL. 0956415, MEX. 0128160, SPN. 403.700, STZ. 0563605, SWD. 7207535.
3,926,518.—OPTICAL SCANNING SYSTEM. DEC. 16, 1975.
3,947,117.—EXPOSURE CONTROL SYSTEM. MAR. 30, 1976.
3,975,289.—CHARGE TRANSFER COMPLEXEX OF FERRONCENES HAVING LIGHT FILLING PROPERTIES. AUG. 17, 1976.

Class 4B

2,689,179.—XEROGRAPHIC CONTACT COPYING DEVICE. SEPT. 14, 1954.
3,912,387.—ELECTROSTATOGRAPHY. OCT. 14, 1975.
3,967,894.—A SCREENED OPTICAL SYSTEM. JULY 6, 1976.
3,967,895.—ILLUMINATION CONTROL SYSTEM. JULY 6, 1976.

Class 4B 1

2,583,546.—ELECTROPHOTOGRAPHIC RECORDING. JAN. 29, 1952.
3,062,094.—ELECTROPHOTOGRAPHIC COPYING APPARATUS. NOV. 6, 1962. JAP. 0286655.
3,062,095.—PROJECTOR OPTICAL SCANNING SYSTEM. NOV. 6, 1962. CAN. 0706050.
3,062,108.—ELECTROPHOTOGRAPHIC COPYING APPARATUS. NOV. 6, 1962.
3,076,392.—XEROGRAPHIC REPRODUCING APPARATUS. FEB. 5, 1963. CAN. 0689623, FRA. 1271754, GER. 1209418, GRB. 0962654.
3,137,202.—OPTICAL SCANNING APPARATUS FOR XEROGRAPHIC PRINTERS. JUNE 16, 1964. CAN. 0685880.
3,221,622.—OPTICAL SCANNING SYSTEM. DEC. 7, 1965. ADN. 0000471, ARG. 0150818, ATR. 0267325, AUS. 0402541, BEL. 0657557, BRS. 00J3737, BRU. 0000469, CAN. 0756354, EIR. 0028649, FIJ. 0000342, FIN. 0045258, FRA. 1420763, GER. 1497089, GHA. 0000994, GIB. 1089536, GIE. 0006969, GRB. 1089536, GRK. 0029663, GUR. 1089536, HGK. 0009169, HOL. 0146615, ISR. 0022618, ITL. 0742392, JAP. 0599246, JER. 0000P96, KEN. 0001744, LXB. 0047657, MAU. 1927571, MLS. 0015069, NIG. 0001619, NOR. 0118726, NZL. 0140371, PTG. 0043364, SAF. 0646113, SBH. 0005269, SGP. 0008269, SHL. 0000017, SLN. 2677286, SPN. 0307501, SRK. 0000389, STZ. 0450920, SWD. 0338716, UGD. 0000269.
3,318,186.—OPTICAL SYSTEM FOR REPRODUCTION MACHINES. MAY 9, 1967. CAN. 0798356, FRA. 1467332, GRB. 1139231, ITL. 0758313, JAP. 0512656, MEX. 0085288, SWD. 6912062.
3,381,573.—SCANNING ATTACHMENT. MAY 7, 1968. CAN. 0820036, GER. 1945460, GRB. 1134645, JAP. 0524529.
3,405,564.—PULLEY. OCT. 15, 1968. CAN. 0850353.
3,454,335.—SCANNING SYSTEM. JULY 8, 1969. BEL. 0708647, CAN. 0853453, FRA. 1549127, GRB. 1207850, ITL. 0819656, JAP. 0591210.
3,484,163.—SCANNING SYSTEM. DEC. 16, 1969. CAN. 0840630.
3,504,969.—IMAGING APPARATUS. APR. 7, 1970.
3,512,886.—DUAL CARRIAGE SCANNING SYS. MAY 19, 1970. CAN. 0875712, GRB. 1235136.
3,523,725.—XEROGRAPHIC REPRODUCING APPARATUS. AUG. 11, 1970. CAN. 0917730, GRB. 1271862.
3,532,425.—GRAPHIC DISTORTION APPARATUS. OCT. 6, 1970.
3,552,221.—SPEED CONVERTING MECHANISM. JAN. 5, 1971.
3,591,277.—XEROGRAPHIC REPRODUCING APPARATUS. JULY 6, 1971. AUS. 0428584, BEL. 0723949, CAN. 0869628, CZC. 0157352, FRA. 1591801, GER. 0989774, GRB. 1223429, ITL. 0856815, SWD. 0348060, USR. 0465805.
3,612,679.—SCANNING APPARATUS. OCT. 12, 1971. GRB. 1307918.
3,671,237.—METHOD FOR PRODUCING IMAGES. JUNE 20, 1972. CAN. 0886492, GRB. 1317043.
3,794,418.—IMAGING SYSTEM. FEB. 26, 1974.
3,832,057.—SCANNING APPARATUS. AUG. 27, 1974. GRB. 1417255.
3,858,976.—OPTICAL SCANNING SYSTEM. JAN. 7, 1975.
3,869,204.—SCANNING OPTICAL SYSTEM. MAR. 4, 1975. BEL. 0815215.
3,905,247.—CLUTCHES. SEPT. 16, 1975.
3,918,806.—DASHPOT FOR COPIER OPTICAL SCANNING. NOV. 11, 1975.
3,936,173.—OPTICAL SYSTEM. FEB. 3, 1976.
3,948,374.—CLUTCHES. APR. 6, 1976.
3,973,825.—FLAT FIELD SCANNING SYSTEM. AUG. 10, 1976. BEL. 0836735.

Class 4B 1A

3,139,013.—DOCUMENT REPRODUCING APPARATUS. JUNE 30, 1964. CAN. 0727819, FRA. 1346596, GRB. 1016265, JAP. 0442652.
3,330,190.—PRINTING APPARATUS. JULY 11, 1967. CAN. 0758791, GER. 1280282, GRB. 1102419, JAP. 0529726.
3,438,704.—ILLUMINATION CONTROL SYSTEM. APR. 15, 1969. CAN. 0865838, GRB. 1209473, JAP. 1002842.
3,485,546.—FIELD FLATTENER SCANNING MEANS. DEC. 23, 1969. CAN. 0850916, GRB. 1196373, JAP. 0667705.
3,504,960.—SAGITTAL RAY APERTURE STOP. APR. 7, 1970. AUS. 0413558, BEL. 0704924, CAN. 0849815, FRA. 1540700, GRB. 1209472, ITL. 0814606, JAP. 0972613.
3,524,704.—MULTI-LENGTH DOCUMENT RECORDING APPARATUS. AUG. 18, 1970.
3,542,467.—XEROGRAPHIC REPRODUCING APPARATUS. NOV. 24, 1970. ARG. 0180116, AUS. 0442029, BEL. 0731552, BRA. 6908056, CAN. 0877451, FRA. 6911558, GRB. 1257103, ITL. 0857659, JAP. 0668806, MEX. 0108892, SPN. 0366056, SWD. 0346397, VZL. 0023746.
3,592,531.—SPLIT DAGOR-TYPE OF SYMMETRICAL COPYING LENS SYSTEM. JULY 13, 1971. CAN. 0929389.
3,640,615.—XEROGRAPHIC REPRODUCING APPARATUS. FEB. 8, 1972. ARG. 0174792, AUS. 0428440, BEL. 0723948, CAN. 0884439, FRA. 1596660, GRB. 1223428, ITL. 0847541, JAP. 0992414, MEX. 0108966, PNM. 0001806, SPN. 0360210, SWD. 0352456, VZL. 0023711.
3,652,157.—MICROFILM PROJECTION APPARATUS. MAR. 28, 1972. CAN. 0937797, GRB. 1324097.
3,655,284.—LONGITUDINALLY INSENSITIVE LENS STRIP IMAGING DEVICE. APR. 11, 1972.
3,670,633.—RECORDING APPARATUS. JUNE 20, 1972.
3,778,147.—ELECTROSTATIC REPRODUCTION MACHINE HAVING SLEECTSBLE MAGNIFICATIONRATIOS. DEC. 11, 1973. CAN. 989464.
3,788,740.—IMAGING SYSTEM. JAN. 29, 1974.
3,975,289.—CHARGE TRANSFER COMPLEXEX OF FERRONCENES HAVING LIGHT FILLING PROPERTIES. AUG. 17, 1976.

Class 4B 1A 1

3,544,190.—LENS STRIP OPTICAL SCANNING SYSTEM. DEC. 1, 1970. CAN. 0904070, GRB. 1278336.
3,584,950.—LENS STRIP OPTICAL SCANNING SYSTEM. JUNE 15, 1971.
3,584,952.—LENS STRIP OPTICAL SCANNING SYSTEM - REISSUED D 2074R. JUNE 15, 1971.
3,584,953.—SHORT FOCAL OPTICAL LENGTH SCANNING SYSTEM. JUNE 15, 1971.
3,650,621.—OPTICAL IMAGING SYSTEM. MAR. 21, 1972. BEL. 0747978, CAN. 0927470, FRA. 7011548, GRB. 1297907, ITL. 0898936, JAP. 0731225.
3,881,369.—BI-AXIAL POSITIONER. MAY 6, 1975.
3,912,392.—SHORT FOCAL LENGTH OPTICAL SCANNING SYSTEM. OCT. 14, 1975.

Class 4B 1A 2

3,560,085.—APPARATUS FOR GRAPHIC DISTORATION. FEB. 2, 1971.
3,681,777.—RECORDING APPARATUS. AUG. 1, 1972.

Class 4B 1A 3

3,120,790.—XEROGRAPHIC EXPOSURE APPARATUS. FEB. 11, 1964. AUS. 0270483, FRA. 1333280, GER. 1204066, GRB. 1019291, ITL. 0674895, JAP. 0468454.
3,535,036.—APPARATUS FOR FORMING HALF-TONE LINE SCREEN WITH A LENS. OCT. 20, 1970. CAN. 0909309, GRB. 1253887.
3,540,806.—HALF TONING METH AND APPARATUS FOR SOLID AREA COVERAG. NOV. 17, 1970. CAN. 0892754, GRB. 1253888.
3,580,671.—EXPOSURE APPARATUS. MAY 25, 1971. CAN. 0912104, GRB. 1276010.
3,905,822.—COMPOUND SCREEN FOR OBJECT SCREENING. SEPT. 16, 1975.

3,912,510.—ELECTROPHOTOGRAPHIC PROCESS EMPLOYING A COMPOUND DOCUMENT SCREEN. OCT. 14, 1975.
3,914,040.—REVERSIBLE SCREEN FOR ELECTROPHOTOGRAPHIC PRINTING. OCT. 21, 1975.
3,958,877.—HALF-TONE SCREEN WITH CLEANING MEANS FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. MAY 25, 1976.
3,961,847.—AN ARCUATE SCREEN FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. JUNE 8, 1976.
3,961,848.—AN ELECTROPHOTOGRAPHIC PRINTING MACHINE WITH HALFTONE SCREEN CLEANING. JUNE 8, 1976.
3,963,342.—CURVED SCREEN. JUNE 15, 1976.
3,973,953.—IMAGING METHOD INCLUDING EXPOSURE OF PHOTOCONDUCTIVE IMAGING MEMBER THROUGH LENTICULAR LENS ELE. AUG. 10, 1976. STZ. 0557051.
3,973,954.—IMAGING METHOD INCLUDING EXPOSURE OF PHOTOCONDUCTIVE IMAGING MEMBER THROUGH LENTICULAR LENS ELE. AUG. 10, 1976. STZ. 0557051.
3,973,957.—IMAGING METHOD INCLUDING EXPOSURE OF DEFORMATION IMAGING MEMBER THROUGH LENTICULAR LENS ELEMENT. AUG. 10, 1976.
3,973,958.—IMAGING METHOD INCLUDING EXPOSURE OF DEFORMATION IMAGING MEMBER THROUGH LENTICULAR ELEMENT. AUG. 10, 1976.

Class 4B 1A 4

3,424,525.—MICROFILM COPIER ATTACHMENT. JAN. 28, 1969.
3,542,468.—MICROFILM ENLARGER-COPIER MICROFILM ATTACHMENT. NOV. 24, 1970. CAN. 0858250.
3,547,533.—MICROFILM REPRODUCTION MACHINE. DEC. 15, 1970. BEL. 0689227, CAN. 0891072, FRA. 1498788, GRB. 1160904, ITL. 0794772, MEX. 0095144.

Class 4B 1A 2

3,496,846.—SCRIPTWRITER USING FIBER OPTIC BUNDLE. FEB. 24, 1970.

Class 4B 1A 3

3,497,296.—XEROGRAPHIC EXPOSURE APPARATUS. FEB. 24, 1970.

Class 4B 2

3,220,324.—PHOTOCONDUCTIVELY CONTROLLED CORONA CHARGING. NOV. 30, 1965. CAN. 0710976, GER. 1243967, GRB. 1034009, JAP. 0651092.
3,254,998.—INDUCTION IMAGE FORMATION. JUNE 7, 1966. CAN. 0740576, FRA. 1357220, GER. 1276445, GRB. 1024985, JAP. 0451689.
3,307,034.—TWO-WIRE CORONA DISCHARGE SYSTEM FOR SINGLE-STEP ELECTROSTATIC IMAGE FORMATION. FEB. 28, 1967. CAN. 0768802, FRA. 1416275, GER. 1275864, GRB. 1055416, ITL. 0744235, JAP. 0491997.
3,394,002.—CHARGE TRANSFER WITH LIQUID LAYERS. JULY 23, 1968. CAN. 0840028, GRB. 1126048, JAP. 0524527.
3,698,807.—DISPLAYING AND PRINTING APPARATUS. OCT. 17, 1972. CAN. 0963521, GRB. 1376814.

Class 4B 3

3,283,651.—INFORMATION ENCODING DEVICE. NOV. 8, 1966. CAN. 0859923, GRB. 1096645, JAP. 0547197.
3,532,425.—GRAPHIC DISTORTION APPARATUS. OCT. 6, 1970.
3,560,085.—APPARATUS FOR GRAPHIC DISTORATION. FEB. 2, 1971.
3,584,950.—LENS STRIP OPTICAL SCANNING SYSTEM. JUNE 15, 1971.
3,584,953.—SHORT FOCAL OPTICAL LENGTH SCANNING SYSTEM. JUNE 15, 1971.
3,725,059.—METHOD OF CLEANING AN ELECTROSTATOGRAPHIC SURFACE. APR. 3, 1973. GRB. 1337282.
3,862,801.—METHOD OF CLEANING AN ELECTROSTATOGRAPHIC IMAGING SURFACE. JAN. 28, 1975. GRB. 1337282.

Class 4B 4

2,781,704.—XEROGRAPHIC COPIER CAMERA UNIT. FEB. 19, 1957. CAN. 0581458.
2,962,374.—COLOR XEROGRAPHY. NOV. 29, 1960.
2,965,483.—XEROGRAPHIC CONTRAST. DEC. 20, 1960. CAN. 0616969.
3,283,651.—INFORMATION ENCODING DEVICE. NOV. 8, 1966. CAN. 0859923, GRB. 1096645, JAP. 0547197.
3,432,231.—EXPOSURE CONTROL DEVICE. MAR. 11, 1969.
3,473,455.—EXPOSURE REGISTRATION APPARATUS. OCT. 21, 1969.
3,521,950.—XEROGRAPHIC REPRODUCING APPARATUS. JULY 28, 1970. ARG. 0184148, ATR. 0317675, AUS. 0441739, BEL. 0713876, CAN. 0877511, CHL. 0024535, DNK. 0129304, FRA. 1558225, GRB. 1231622, GRK. 0037839, IND. 0124668, ISR. 0029824, ITL. 0831700, JAM. 0001853, JAP. 0774498, LXB. 0055912, MEX. 0102085, NOR. 0131313, NZL. 0159801, PRU. 0009366, PTG. 0049474, SAF. 68/2518, SPN. 0352885, STZ. 0505015, SWD. 7012263, UAR. 0008668, URG. 0009239, VZL. 0025077.
3,586,849.—ILLUMINATION SYSTEM. JUNE 22, 1971. ARG. 0183139, ATR. 0303522, AUS. 0428629, BEL. 0733400, BRA. 6908480, CAN. 0903730, CHL. 0024870, FRA. 6917011, GRB. 1260688, ITL. 0864185, MEX. 0111515, NOR. 0125954, NZL. 0156507, PNM. 0001430, PRU. 0010320, PTG. 0051752, SAF. 0693689, SPN. 0367616, STZ. 0758269, SWD. 0354924, VZL. 0025067.
3,697,160.—CONTINUOUS IMAGING APPARATUS. OCT. 10, 1972.

Class 4B 5

3,094,910.—REFLEX XEROGRAPHIC APPARATUS. JUNE 25, 1963. CAN. 0704293, GRB. 0997415.
3,212,417.—REFLEX EXPOSURE SYSTEM. OCT. 19, 1965. CAN. 0733682, GRB. 1052783, JAP. 0487026.
3,278,302.—PHOSPHORESCENT SCREEN REFLEX. OCT. 11, 1966. CAN. 0748828.

Class 4B 6

3,076,392.—XEROGRAPHIC REPRODUCING APPARATUS. FEB. 5, 1963. CAN. 0689623, FRA. 1271754, GER. 1209418, GRB. 0962654.
3,355,236.—AUTOMATIC OPTICAL CONTROL APPARATUS. NOV. 28, 1967. CAN. 0771917.
3,542,467.—XEROGRAPHIC REPRODUCING APPARATUS. NOV. 24, 1970. ARG. 0180116, AUS. 0442029, BEL. 0731552, BRA. 6908056, CAN. 0877451, FRA. 6911558, GRB. 1257103, ITL. 0857659, JAP. 0668806, MEX. 0108892, SPN. 0366056, SWD. 0346397, VZL. 0023746.
3,765,027.—ION LENS RECORDING SYSTEM. OCT. 9, 1973.
3,848,996.—PHOTOCOMPOSING APPARATUS. NOV. 19, 1974. BEL. 0815043.
3,909,103.—LENS SCAN MECHANISM. SEPT. 30, 1975.
3,947,188.—VARIABLE CONJUGATE OPTICAL SYSTEM. MAR. 30, 1976.
3,967,896.—VARIABLE EDGE FADEOUT APP FOR ELECTROSTATIC REPRODUCTION MACHINE. JULY 6, 1976.

Class 4B 6A

3,318,186.—OPTICAL SYSTEM FOR REPRODUCTION MACHINES. MAY 9, 1967. CAN. 0798056, FRA. 1467332, GRB. 1139231, ITL. 0758313, JAP. 0512656, MEX. 0085288, SWD. 6912062.
3,454,335.—SCANNING SYSTEM. JULY 8, 1969. BEL. 0708647, CAN. 0853453, FRA. 1549127, GRB. 1207850, ITL. 0819656, JAP. 0591210.
3,476,478.—APPARATUS FOR CHANGING MAGNIFICATION OF PHOTOCOPIER W/O CHANGING CONJUGATE LENGTH OF OPTICAL SY. NOV. 4, 1969. ARG. 0172460, AUS. 0415808, BEL. 0708650, BRA. 6795668, CAN. 0845405, FRA. 1552364, GER. 1297981, GRB. 1223427, ITL. 0821929, MEX. 0100019, VZL. 0023689.
3,510,219.—OPTICAL ALIGNMENT SYSTEM. MAY 5, 1970. ARG. 0172455, BRA. 6793791, CAN. 0881018, CHL. 0023570, GRB. 1206966, MEX. 0101166, PRU. 0009329, SPN. 0360896, STZ. 0501233, SWD. 0359168, URG. 0008831, VZL. 0025783.
3,521,950.—XEROGRAPHIC REPRODUCING APPARATUS. JULY 28, 1970. ARG. 0184148, ATR. 0317675, AUS. 0441739, BEL. 0713876, CAN. 0877511, CHL. 0024535, DNK. 0129304, FRA. 1558225, GRB. 1231622, GRK. 0037839, IND. 0124668, ISR. 0029824, ITL. 0831700,

JAM. 0001853, JAP. 0774498, LXB. 0055912, MEX. 0102085, NOR. 0131313, NZL. 0159801, PRU. 0009366, PTG. 0049474, SAF. 68/2518, SPN. 0352885, STZ. 0505015, SWD. 7012263, UAR. 0008668, URG. 0009239, VZL. 0025077.

3,524,704.—MULTI-LENGTH DOCUMENT RECORDING APPARATUS. AUG. 18, 1970.

3,591,256.—VARIABLE MAGNIFICATION LENS SYSTEM. JULY 6, 1971. BEL. 0731553, CAN. 0881019, FRA. 6911559, GRB. 1234515, ITL. 0857660.

3,591,277.—XEROGRAPHIC REPRODUCING APPARATUS. JULY 6, 1971. AUS. 0428584, BEL. 0723949, CAN. 0869628, CZC. 0157052, FRA. 1591801, GER. 0989774, GRB. 1223429, ITL. 0856815, SWD. 0348060, USR. 0465805.

3,600,066.—OPTICAL ASSEMBLY WITH SUPPLEMENTAL LENS MEANS. AUG. 17, 1971. CAN. 0943792, GRB. 1261159, JAP. 0728824.

3,817,599.—PROJECTION LENS WITH ADD LENS ELEMENTS. JUNE 18, 1974.

3,912,374.—SIX COMPONENT ZOOM LENS. OCT. 14, 1975.

Class 4B 7

3,470,797.—DISPLAY DEVICE. OCT. 7, 1969.

3,472,136.—CHARACTER GENERATOR. OCT. 14, 1969. CAN. 0884500, GRB. 1191881.

3,473,455.—EXPOSURE REGISTRATION APPARATUS. OCT. 21, 1969.

3,523,725.—XEROGRAPHIC REPRODUCING APPARATUS. AUG. 11, 1970. CAN. 0917730, GRB. 1271862.

3,615,132.—METHOD OF PRINTING MULTIPLE COPIES OF COMPOSITE INFORMATION ON STANDARD SIZE COPY SHEETS. OCT. 26, 1971.

3,620,618.—MULTIPLE INPUT COPYING APPARATUS. NOV. 16, 1971.

3,775,007.—FORMS REPRODUCTION APPARATUS. NOV. 27, 1973.

3,827,062.—OPTICAL ARRANGEMENT FOR HIGH SPEED PRINTOUT SYSTEM. JULY 30, 1974.

Class 4C

2,965,483.—XEROGRAPHIC CONTRAST. DEC. 20, 1960. CAN. 0616969.

3,188,208.—SPECTRAL CONTRAST CONTROL IN XEROGRAPHY. JUNE 8, 1965.

3,432,232.—ILLUMINATION SYSTEM. MAR. 11, 1969. CAN. 0846423, JAP. 0534763.

3,438,705.—AUTOMATIC XEROGRAPHIC DEVELOPMENT CONTROL. APR. 15, 1969. GRB. 1207830.

3,852,782.—IMAGING SYSTEM. DEC. 3, 1974.

3,917,393.—VARIOSLIT. NOV. 4, 1975. BEL. 0820132.

3,975,289.—CHARGE TRANSFER COMPLEXES OF FERRONCENES HAVING LIGHT FILLING PROPERTIES. AUG. 17, 1976.

Class 4C 1

3,901,189.—MAGNETIC BRUSH DEVELOPING APPARATUS. AUG. 26, 1975.

Class 4C 2

3,970,382.—A SPATIALLY SELECTIVE OPTICAL SYSTEM. JULY 20, 1976.

Class 4D 1

3,943,528.—METHOD FOR PRODUCING AN IMAGE USING PERSISTENT ELECTROCHROMIC MATERIALS. MAR. 9, 1976.

Class 4E

3,942,007.—LIQUID CRYSTALLINE IMAGE CONVERTER. MAR. 2, 1976.

Class 5

3,942,266.—METHOD AND APPARATUS FOR FIXING TONER IMAGES. MAR. 9, 1976.

Class 5A 1

2,221,776.—ELECTRON PHOTOGRAPHY. NOV. 19, 1940.

2,725,304.—PROCESS FOR DEVELOPING AN ELECTROSTATIC LATENT IMAGE. NOV. 29, 1955. CAN. 0557666.

2,792,971.—PARTICLE AEROSOL GENERATION. MAY 21, 1957.

2,815,330.—GENERATOR OF AEROSOL OF POWDER IN GAS. DEC. 3, 1957.

2,815,734.—APPARATUS FOR DEVELOPING XEROGRAPHIC IMAGE. DEC. 10, 1957.

2,859,127.—PROCESS FOR DEVELOPING ELECTROSTATIC IMAGES. NOV. 4, 1958. CAN. 0557667.

2,859,129.—PROCESS FOR DEVELOPING ELECTROSTATIC IMAGES AND APPARATUS THEREFOR. NOV. 4, 1958.

2,861,543.—APPARATUS FOR DEVELOPMENT OF ELECTROSTATIC IMAGE. NOV. 25, 1958. CAN. 0597655.

2,862,472.—ELECTROSTATIC IMAGE DEVELOPMENT APPARATUS. DEC. 2, 1958. CAN. 0619384, FRA. 1210178, GER. 1121473, GRB. 0895777, ITL. 0594503.

2,862,646.—POWDER PARTICLE AEROSOL GENERATOR. DEC. 2, 1958.

2,876,737.—APPARATUS FOR DEVELOPING ELECTROSTATIC IMAGES ON SHEET MATERIAL. MAR. 10, 1959.

2,878,972.—ROUGH SURFACE POWDER CLOUD GENERATION. MAR. 24, 1959.

2,943,950.—ELECTROSTATIC DEVELOPING APPARATUS AND METHOD. JULY 5, 1960. CAN. 0564395.

3,008,826.—XEROGRAPHIC DEVELOPMENT. NOV. 14, 1961.

3,094,248.—XEROGRAPHIC DEVELOPING APPARATUS. JUNE 18, 1963. CAN. 0678004, GRB. 0985306.

3,276,426.—CLOSED AEROSOL DEVELOPMENT. OCT. 4, 1966.

3,518,969.—DEVELOPMENT APPARATUS. JULY 7, 1970. CAN. 0852127, GRB. 1259879.

3,791,730.—APPARATUS FOR DEVELOPING ELECTROSTATIC LATENT IMAGES. FEB. 12, 1974.

3,795,443.—XEROGRAPHIC DEVELOPMENT. MAR. 5, 1974. GRB. 1255568, JAP. 0721852.

Class 5A 1A

2,824,545.—APPARATUS FOR DEVELOPING XEROGRAPHIC IMAGES. FEB. 25, 1958.

2,831,409.—XEROGRAPHIC CAMERA. APR. 22, 1958. CAN. 0575071.

3,060,131.—POWDER CLOUD GENERATING APPARATUS. OCT. 23, 1962.

3,129,113.—AUTOMATIC POWDER APPLICATOR APPARATUS. APR. 14, 1964.

3,640,246.—DEVELOPMENT APPARATUS FOR LATENT ELECTROSTATIC IMAGE. FEB. 8, 1972. ATR. 0319044, AUS. 0457007, BEL. 0758632, CAN. 0917404, FRA. 7042231, GRB. 1336741, ITL. 0909113, JAP. 0815548, SPN. 0385187, STZ. 0527453, SWD. 0363411, USR. 0505386.

3,646,910.—DEVELOPMENT APPARATUS FOR LATENT ELECTROSTATIC IMAGES. MAR. 7, 1972.

3,924,568.—APPARATUS FOR DEVELOPING LATENT ELECTROSTATIC IMAGES. DEC. 9, 1975. BEL. 0809747, GRB. 1434673.

Class 5A 2

2,784,109.—METHOD FOR DEVELOPING ELECTROSTATIC IMAGES. MAR. 5, 1957. CAN. 0558593, GRB. 0698994.

2,811,135.—POWDER CHARGING DEVICE. OCT. 29, 1957.

2,873,721.—MICRO-MANIFOLD FOR POWDER CLOUD DEVELOPMENT. FEB. 17, 1959.

2,894,486.—APPARATUS FOR XEROGRAPHIC DEVELOPMENT. JULY 14, 1959.

3,160,524.—APPARATUS FOR CHARGING POWDER PARTICLES AND APPLYING THE CHARGED PARTICLES TO A RECEIVING MEMBER. DEC. 8, 1964. CAN. 0779861, GRB. 1026457.

3,257,223.—ELECTROSTATIC POWDER CLOUD XEROGRAPHIC DEVELOPMENT METHOD AND APPARATUS. JUNE 21, 1966. CAN. 0756559, GRB. 1028900, JAP. 0460474.

3,284,224.—CONTROLLED XEROGRAPHIC DEVELOPMENT. NOV. 8, 1966. CAN. 0751349, GRB. 1038801, JAP. 0640353.

3,357,403.—POWDER CLOUD DEVELOPMENT APPARATUS. DEC. 12, 1967.

3,470,009.—POWDER CLOUD DEVELOPMENT OF ELECTROSTATIC IMAGES. SEPT. 30, 1969. CAN. 0820240, FRA. 1461941, GRB. 1130452, HOL. 0142253, ITL. 0750148, JAP. 0512653, MEX. 0085176.

3,707,390.—METHOD FOR DEVELOPING ELECTROSTATIC LATENT IMAGES. DEC. 26, 1972.

3,767,446.—DEVELOPMENT METHOD WITH OSCILLATING BRUSH PAD. OCT. 23, 1973.

Class 5A 3

RE.28,183.—POWDER CLOUD. OCT. 1, 1974. ARG. 0119221, BEL. 0764300, CAN. 0939137, FRA. 7110037, GRB. 1351471, ITL. 0921294, MEX. 0119823, VZL. 0032790.

RE.28,193.—POWDER CLOUD XEROGRAPHIC DEVELOPMENT APPARATUS. OCT. 8, 1974. ARG. 0119221, BEL. 0764300, CAN. 0939137, FRA. 7110037, GRB. 1351471, ITL. 0921294, MEX. 0119823, VZL. 0032790.

2,842,456.—PROCESS FOR DEVELOPING AN ELECTROSTATIC IMAGE. JULY 8, 1958.

2,911,945.—APPARATUS FOR DEVELOPING ELECTROSTATIC IMAGES. NOV. 10, 1959.

2,914,221.—AEROSOL BOMB DEVELOPMENT. NOV. 24, 1959.

2,918,900.—APPARATUS FOR XEROGRAPHIC DEVELOPMENT. DEC. 29, 1959.

2,935,234.—POWDER CLOUD GENERATING APPARATUS. MAY 3, 1960. CAN. 0655160, GRB. 0957862.

2,965,069.—XEROGRAPHIC DEVELOPING APPARATUS. DEC. 20, 1960.

2,992,758.—POWDER CLOUD GENERATING APPARATUS. JULY 18, 1961. CAN. 0678816.

3,129,850.—POWDER CLOUD GENERATING APPARATUS. APR. 21, 1964. CAN. 0693933, GER. 1497044, GRB. 1001237, JAP. 0436042.

3,648,901.—POWDER CLOUD XEROGRAPHIC DVLMNT APP-REISSUED AS 28183 AND 28193 10/74. MAR. 14, 1972. ARG. 0119221, BEL. 0764300, CAN. 0939137, FRA. 7110037, GRB. 1351471, ITL. 0921294, MEX. 0119823, VZL. 0032790.

3,799,113.—HYBRID DEVELOPMENT OF ELECTROSTATIC LATENT IMAGE. MAR. 26, 1974. CAN. 0980634, GRB. 1411708.

Class 5A 3A

2,832,511.—GENERATOR OF AN AEROSOL OF POWDER PARTICLES. APR. 29, 1958. CAN. 0705239, GER. 1170782, GRB. 0830780.

2,837,441.—XEROGRAPHIC WET BELT LOADING. JUNE 3, 1958.

2,843,084.—XEROGRAPHIC APPARATUS WITH ENDLESS DEVELOPMENT ELECTRODE. JULY 15, 1958.

2,843,295.—POWDER CLOUD GENERATOR. JULY 15, 1958.

2,859,128.—METHOD OF DEVELOPING XEROGRAPHIC IMAGE. NOV. 4, 1958. CAN. 0612193, FRA. 1148569, GER. 1063898.

3,060,131.—POWDER CLOUD GENERATING APPARATUS. OCT. 23, 1962.

Class 5A 3B

2,759,450.—XEROGRAPHIC DEVELOPING APPARATUS. AUG. 21, 1956. GRB. 0821337.

2,872,338.—ELECTROPHOTOGRAPHIC DEVELOPING PROCESS. FEB. 3, 1959.

2,877,132.—METHOD FOR DEVELOPMENT OF ELECTROSTATIC IMAGES. MAR. 10, 1959.

2,928,575.—ELECTROSTATIC IMAGE DEVELOPMENT. MAR. 15, 1960. CAN. 0634369.

3,599,604.—XEROGRAPHIC DEVELOPMENT APPARATUS. AUG. 17, 1971. ARG. 0187552, ATR. 0300574, AUS. 0427548, BEL. 0726572, BUL. 0017289, CAN. 0882577, DNK. 0122194, EGR. 0074431, EIR. 0032989, FRA. 1597322, GRB. 1248671, GRK. 0039920, IND. 0120485, ISR. 0031892, ITL. 0854007, LXB. 0058261, MEX. 0108936, NZL. 0155879, PAK. 0121035, PLP. 0006856, PNM. 0001804, PTG. 0051418, RHD. 1406967, RMN. 0054927, SAF. 0069181, SPN. 0362359, STZ. 0493015, UAR. 0009253, VTM. 0001857, VZL. 0023728.

3,633,544.—TURBO-CLOUD DEVELOPMENT. JAN. 11, 1972. CAN. 0934959, GRB. 1322363, JAP. 0741518.

3,670,701.—TWO STEP ORBITAL PAD DEVELOPMENT. JUNE 20, 1972. CAN. 0092849, GRB. 1313870, JAP. 0743834.

3,882,822.—APPARATUS FOR DEVELOPING ELECTROSTATIC LATENT IMAGE. MAY 13, 1975.

Class 5A 4

2,573,881.—METHOD AND APPARATUS FOR DEVELOPING ELECTROSTATIC IMAGES WITH ELECTROSCOPIC POWDER. NOV. 6, 1951. AUS. 0149247, CAN. 0479868, GER. 0903414, GRB. 0693905, STZ. 0286142, SWD. 0171735.

2,824,813.—METHOD FOR DEVELOPING ELECTROSTATIC LATENT IMAGES. FEB. 25, 1958.

Class 5A 5

2,965,136.—XEROGRAPHIC DEVELOPING APPARATUS. DEC. 20, 1960.

3,483,679.—FILTER APPARATUS. DEC. 16, 1969. BEL. 0708648, CAN. 0853503, FRA. 1552363, ITL. 0837050.

3,697,263.—METHOD OF CLEANING RESIDUAL LIQUID DEVELOPER FROM ELECTROPHOTOGRAPHIC PLATES. OCT. 10, 1972. ARG. 0181940, AUS. 0455091, BEL. 0758060, CAN. 0906334, EGR. 0087483, FRA. 7041623, GRB. 1328406, ITL. 0916264, MEX. 0116862, SPN. 0385000, STZ. 0519186, SWD. 0365624, TIW. 0006850, USR. 0349206.

3,924,568.—APPARATUS FOR DEVELOPING LATENT ELECTROSTATIC IMAGES. DEC. 9, 1975. BEL. 0809747, GRB. 1434673.

3,937,570.—CLOUD SUPPRESSION IN AN ELECTROSTATIC COPYING APPARATUS. FEB. 10, 1976. GRB. 1396922.

Class 5A 5A

3,345,293.—COLORED ELECTROSTATOGRAPHIC TONERS CONTAINING ORGANIC DYE PIGMENTS. OCT. 3, 1967. CAN. 0834674, GRB. 1074147, JAP. 0788652.

Class 5A 6

2,899,331.—PROCESS OF DEVELOPING ELECTROSTATIC IMAGE WITH CHARCOAL. AUG. 11, 1959.

Class 5B

3,103,445.—METHOD OF DEVELOPING AN ELECTROSTATIC LATENT IMAGE ON A XEROGRAPHIC PLATE. SEPT. 10, 1963. CAN. 0705363.

3,251,706.—XEROGRAPHIC DEVELOPMENT METHOD AND APPARATUS. MAY 17, 1966. CAN. 0629542, FRA. 1120534, GER. 1020234, GRB. 0774433.

3,357,402.—ROTARY BRUSH DEVELOPMENT. DEC. 12, 1967. ARG. 0167329, ATR. 0279354, AUS. 0416581, BEL. 0708497, BRA. 0088306, CAN. 0859029, FRA. 1548189, GRB. 1200068, HUN. 0156541, ITL. 0819626, JAP. 0608703, MEX. 0106260, PLD. 0071357, SPN. 0348633, SWD. 0328190, VZL. 0023686.

3,542,466.—DEVELOPMENT APPARATUS. NOV. 24, 1970. AUS. 0428620, BEL. 0725611, CAN. 0884213, FRA. 1598505, GRB. 1203167, ITL. 0870661, JAP. 0641479, SPN. 0361653, SWD. 0343694.

3,558,339.—METHOD OF AND APPARATUS FOR STIPPLING. JAN. 26, 1971. CAN. 0871649, GRB. 1266969.

3,574,301.—DEVELOPING APPARATUS. APR. 13, 1971. AUS. 0449350, BEL. 0748073, CAN. 0873249, GRB. 1303493, ITL. 0899146, JAP. 0715126, STZ. 0518579, SWD. 0356379, USR. 0331581.

3,592,167.—APPARATUS FOR LOADING TONER ON A DEVELOPING BRUSH. JULY 13, 1971.

3,613,638.—MATERIALS FOR FIBROUS DEVELOPMENT. OCT. 19, 1971. CAN. 0910736.

3,632,370.—MULTIPLE BRUSH DEVELOPMENT. JAN. 4, 1972.

3,636,924.—FUR BRUSH DEVELOPING APPARATUS. JAN. 25, 1972. CAN. 0912811, GRB. 1340060, JAP. 0751882.

3,638,613.—TONER DEVELOPER SYSTEM. FEB. 1, 1972. AUS. 0445403, BEL. 0747124, CAN. 0889762, EGR. 0081783, FRA. 7007651, GRB. 1294603, ITL. 0898243, SPN. 0377302, STZ. 0520960, SWD. 0354363, TIW. 0006827.

3,687,106.—DONOR APPARATUS AND METHOD. AUG. 29, 1972. ARG. 0185079, BEL. 0753207, CAN. 0911706, FRA. 7027124, GRB. 1314862, ITL. 0900444, JAP. 0733285, MEX. 0117318, PNM. 0002237, VZL. 0027517.

3,692,402.—MATERIALS FOR FIBROUS DEVELOPMENT AND CLEANING MEMBER. SEPT. 19, 1972.

3,847,306.—DEVELOPING APPARATUS. NOV. 12, 1974. CAN. 0966998, GRB. 1353651.

Class 5C

3,648,657.—ELECTROSTATIC IMAGE DEVELOPMENT APPARATUS. MAR. 14, 1972.

3,805,739.—CONTROLLING MULTIPLE VOLTAGE LEVELS FOR ELECTROSTATIC PRINTING. APR. 23, 1974. CAN. 0972552, GRB. 1382710.

3,854,449.—DEVELOPMENT APPARATUS. DEC. 17, 1974. ARG. 0195893, BEL. 0797447, CAN. 0982886, FRA. 7243003, GRB. 1435761, ITL. 0987768, MEX. 0130638, SAF. 0733407, STZ. 0551030, VZL. 0032067.

3,967,892.—A DEVELOPMENT SYSTEM. JULY 6, 1976.

Class 5C 1

2,975,758.—APPARATUS FOR DEVELOPING ELECTROSTATIC IMAGES. MAR. 21, 1961. CAN. 0622422, GER. 1186746. GRB. 0944654, JAP. 0319308.
3,015,305.—DEVELOPMENT OF ELECTROSTATIC IMAGES. JAN. 2, 1962.
3,113,042.—XEROGRAPHIC APPARATUS WITH MAGNETIC CONVEYOR. DEC. 3, 1963. CAN. 0738917, GRB. 0987985.
3,176,652.—XEROGRAPHIC DEVELOPING APPARATUS. APR. 6, 1965. CAN. 0737851, GRB. 1018787, JAP. 0627140.
3,570,453.—DEVELOPMENT APPARATUS. MAR. 16, 1971. ARG. 0181813, AUS. 0429322, BEL. 0737102, CAN. 0885918, CZC. 0161861, EGR. 0081317, FRA. 6927184, GRB. 1256282, ITL. 0869726, SPN. 0370289, STZ. 0496263, SWD. 0353165, TIW. 0005357, USR. 0380031.
3,572,288.—DEVELOPMENT APPARATUS. MAR. 23, 1971. CAN. 0885917.
3,572,289.—MAGNETIC BRUSH DEVELOPMENT APPARATUS. MAR. 3, 1971.
3,575,139.—ELECTROSTATIC MAGNETIC DEVELOPER UNIT GATING APPARATUS. APR. 20, 1971. CAN. 0930538.
3,583,364.—DEVELOPMENT APPARATUS. JUNE 8, 1971. BEL. 0738574, CAN. 0883725, FRA. 6930427, GRB. 1273187, ITL. 0871550, JAP. 0674394.
3,608,522.—XEROGRAPHIC DEVELOPMENT CONTROL APPARATUS. SEPT. 28, 1971. CAN. 0911704.
3,640,248.—ELECTROSTATIC MAGNETIC DEVELOPING APPARATUS—MULTIPLE MAGNETIC BRUSH UNIT. FEB. 8, 1972. ARG. 0184080, ATR. 0312419, AUS. 0437486, BEL. 0751486, BRA. 0088030, CAN. 0929337, CHL. 0026193, EGR. 0084331, GRB. 1251477, ITL. 0893838, MEX. 0117951, NOR. 0133049, PNM. 0002537, SAF. 0703774, SPN. 0380378, STZ. 0509614, SWD. 0359664, TIW. 0007168, USR. 0419061, VZL. 0025834.
3,641,980.—DEVELOPMENT APPARATUS. FEB. 15, 1972. ARG. 0185081, AUS. 0445430, BEL. 0757698, CAN. 0913354, EGR. 0085713, FRA. 7038237, GRB. 1273456, ITL. 0909031, JAP. 0720627, MEX. 0118187, SPN. 0384576, STZ. 0516183, SWD. 0362510, TIW. 0006205.
3,665,891.—MAGNETIC BRUSH DEVELOPMENT APPARATUS. MAY 30, 1972. CAN. 0914904, GRB. 1347138, JAP. 783770.
3,683,406.—MAGNETIC INCREMENTAL CASCADE DEVELOPMENT SYSTEM. AUG. 8, 1972. CAN. 0945200, GRB. 1335995, JAP. 0752521.
3,697,050.—CROSS MIXING BAFFLE. OCT. 10, 1972. CAN. 0951110.
3,709,713.—METHOD FOR MAGNETIC DEVELOPMENT. JAN. 9, 1973.
3,724,422.—MAGNETIC BRUSH DEVELOPING APPARATUS. APR. 3, 1973. ARG. 0190744, AUS. 0457858, BEL. 0776598, EGR. 0097962, FRA. 7145341, GRB. 1373010, ITL. 0943877, MEX. 0124647, SPN. 0397854, SWD. 0365880, USR. 0459904.
3,788,275.—MAGNETIC SHIELDING APPARATUS. JAN. 29, 1974. BEL. 0801242, CAN. 0973703, ITL. 0990692.
3,828,728.—XEROGRAPHIC DEVELOPMENT SYSTEM. AUG. 13, 1974. BEL. 0791193, CAN. 0980635, FRA. 7240058, GRB. 1413337, ITL. 0970350, SWD. 7214311.
3,866,564.—MAGNETIC BRUSH DEVELOPING APPARATUS FOR COPIERS. FEB. 18, 1975.
3,872,830.—MAGNETIC BRUSH DEVELOPING APPARATUS. MAR. 25, 1975.
3,880,517.—REPRODUCTION MACHINE DEVELOPER APPARATUS. APR. 29, 1975.
3,880,518.—FLOATING DEVELOPER PLATEN FOR REPRODUCTION APPARATUS. APR. 29, 1975.
3,887,367.—METHOD FOR TEMPERATURE STABLIZING PHOTORECEPTORS. JUNE 3, 1975.
3,893,815.—MAGNETIC BRUSH SUPPORT MEMBER. JULY 8, 1975.
3,906,121.—ELECTROSTATIC DEVELOPMENT METHOD USING MAGNETIC BUSH CONFIGURATION TRANSPORT. SEPT. 16, 1975. CAN. 0970631, GRB. 1381049.
3,906,898.—MAGNETIC BRUSH DEVELOPING APPARATUS. SEPT. 23, 1975.
3,911,864.—TONER PRELOADED MAGNETIC BRUSH DEVELOPMENT SYSTEM. OCT. 14, 1975. BEL. 0809859, STZ. 0568594.
3,915,121.—DEVELOPMENT APPARATUS. OCT. 28, 1975.
3,920,329.—BACKGROUND REMOVAL APPARATUS. NOV. 18, 1975.
3,921,577.—MAGNETIC DEVELOPMENT UNIT. NOV. 25, 1975.
3,926,516.—DEVELOPMENT APPARATUS FOR AN ELECTROSTATOGRAPHIC PRINTING MACHINE. DEC. 16, 1975.
3,927,640.—DEVELOPER SHUT-OFF APPARATUS. DEC. 23, 1975.
3,934,549.—TRANSFER APPARATUS. JAN. 27, 1976.
3,945,342.—MAGNETIC BRUSH SUPPORT MEMBER. MAR. 23, 1976.
3,948,217.—MAGNETIC BRUSH DEVELOPMENT SYSTEM WITH FLOATING DEVELOPMENT ROLLS. APR. 6, 1976. BEL. 0835370.
3,962,003.—METHOD OF FORMING MAGNETIC BRUSH SUPPORT MEMBER. JUNE 8, 1976.
3,968,773. JULY 13, 1976.

Class 5C 1A

2,832,311.—APPARATUS FOR DEVELOPMENT OF ELECTROSTATIC IMAGES. APR. 29, 1958. CAN. 0605908, GRB. 0889202.
3,584,601.—MAGNETIC BRUSH BELT DEVELOPMENT. JUNE 15, 1971. CAN. 0884799, GRB. 1238277.
3,592,166.—APPARATUS FOR DEVELOPING ELECTROSTATIC IMAGES. JULY 13, 1971. CAN. 0887598, GRB. 1275822.
3,638,614.—ELECTROSTATIC LATENT IMAGE DEVELOPMENT APPARATUS. FEB. 1, 1972. CAN. 0929338, GRB. 1304236, JAP. 0808219.
3,741,790.—METHOD FOR MAGNETICALLY DEVELOPING ELECTROSTATIC IMAGES. JUNE 26, 1973.
3,823,688.—MAGNETIC BRUSH ASSEMBLY. JULY 16, 1974. BEL. 0794507, CAN. 0989607, GRB. 1394502, SWD. 7301014.
3,965,862.—XEROGRAPHIC DEVELOPMENT SYSTEM. JUNE 29, 1976.

Class 5C 1B

3,532,071.—DEVELOPMENT APPARATUS. OCT. 6, 1970. CAN. 0883763, GRB. 1227549, JAP. 0650630.
3,552,355.—DEVELOPMENT APPARATUS. JAN. 5, 1971. ARG. 0175330, ATR. 0300575, AUS. 0441519, BEL. 0730371, CAN. 0914005, CZC. 0161850, DNK. 0129880, EGR. 0077412, EIR. 0032786, FRA. 6909741, GRB. 1263566, GRK. 0039919, IND. 0120212, ISR. 0031757, ITL. 0860255, LXB. 0058295, MEX. 0111374, NOR. 0128037, NZL. 0155695, PAK. 0120989, PLD. 0017651, PLP. 0006606, PNM. 0001723, PTG. 0051392, RHD. 1156947, SAF. 0691728, SPN. 0365439, STZ. 0499140, SWD. 0341530, TIW. 0006602, UAR. 0009242, USR. 0383338, VTM. 0001829, VZL. 0023745.
3,645,770.—METHOD FOR DEVELOPING XEROGRAPHIC IMAGES. FEB. 29, 1972.
3,893,414.—METHOD AND APP FOR VARYING DEVELOPER BANDWIDTH. JULY 8, 1975.
3,908,596.—SEGMENTED GATE DEVELOPER FLOW CONTROLLER. SEPT. 30, 1975.
3,930,466.—SEGMENTED GATE DEVELOPER FLOW CONTROLLER. JAN. 6, 1976.

Class 5C 2

3,508,823.—DUPLICATING APPARATUS. APR. 28, 1970.
3,836,244.—COLOR XEROGRAPHY. SEPT. 17, 1974.
3,941,280.—APPARATUS FOR CONTROLLING DEVELOPER EFFICIENCY. MAR. 2, 1976.
3,965,862.—XEROGRAPHIC DEVELOPMENT SYSTEM. JUNE 29, 1976.

Class 5C 3

2,846,333.—METHOD OF DEVELOPING ELECTROSTATIC IMAGES. AUG. 5, 1958. CAN. 0609146.
3,906,897.—DEVELOPMENT APPARATUS. SEPT. 23, 1975. ARG. 0195893, BEL. 0797447, CAN. 0982886, FRA. 7243003, GRB. 1435761, ITL. 0987768, MEX. 0130638, SAF. 0733407, STZ. 0551030, VZL. 0032067.
3,940,272.—METHOD OF DEVELOPING AN ELECTROSTATIC LATENT IMAGE. FEB. 24, 1976. ARG. 0195893, BEL. 0797447, CAN. 0982886, FRA. 7243003, GRB. 1435761, ITL. 0987768, MEX. 0130638, SAF. 0733407, STZ. 0551030, VZL. 0032067.

Class 5D

2,618,551.—DEVELOPER FOR ELECTROSTATIC IMAGES. NOV. 18, 1952. AUS. 0148642, CAN. 0495360, GER. 0926587, GRB. 0686466, STZ. 0292431, SWD. 0161100.
3,768,904.—PRINTING APPARATUS INCLUDING REGISTRATION CONTROL. OCT. 30, 1973.
3,793,985.—IMAGING SYSTEM. FEB. 26, 1974.

Class 5D 1

3,884,571.—LEAKAGE DEVELOPER RECIRCULATION. MAY 20, 1975. HOL. 3884571.
3,924,944.—SPLIT DEVELOPER HOUSING. DEC. 9, 1975.
3,219,014.—MECHANICAL SHIELD TO PROTECT MAGNETIC CORE IN XEROGRAPHIC DEVELOPING APPARATUS. NOV. 23, 1965. CAN. 0757573, FRA. 1393298, GER. 1497076, GRB. 1034099, ITL. 0710188, JAP. 0477812.
3,685,488.—XEROGRAPHIC DEVELOPMENT. AUG. 22, 1972.

Class 5D 1A

2,705,199.—METHOD OF DEVELOPING AN ELECTROSTATIC LATENT IMAGE. MAR. 29, 1955. CAN. 0525077.
3,067,720.—XEROGRAPHIC DEVELOPING APPARATUS. DEC. 11, 1962. ARG. 0175377, BEL. 0750689, PNM. 0002011, VZL. 0025828.
3,095,325.—TONER DISPENSER DRIVE MECHANISMS. JUNE 25, 1963.
3,190,264.—XEROGRAPHIC DEVELOPING APPARATUS. JUNE 22, 1965. CAN. 0733036.
3,303,817.—XEROGRAPHIC DEVELOPING APPARATUS. FEB. 14, 1967.
3,472,657.—XEROGRAPHIC DEVELOPMENT METHOD AND APPARATUS. OCT. 14, 1969. AUS. 0418178, BEL. 0680374, CAN. 0813843, FRA. 1477370, GRB. 1141167, ITL. 0766858, JAP. 0537665, MEX. 0091119, SWD. 0330833.
3,593,838.—CONVEYOR BELT. JULY 20, 1971. CAN. 0883720.
3,635,553.—CASCADE DEVELOPING APPARATUS UTILIZING A ROTARY WHEEL WITH SCOOPS. JAN. 18, 1972.
3,649,262.—SIMULTANEOUS DEVELOPMENT-CLEANING OF SAME AREA OF AN ELECTROSTATOGRAPHIC IMAGE SUPPORT SURFACE. MAR. 14, 1972. BEL. 0743661, CAN. 0916232, FRA. 6944511, GRB. 1296997, ITL. 0882670, USR. 0358873.
3,662,711.—DEVELOPMENT APPARATUS. MAY 16, 1972. CAN. 0945757, GRB. 1345253.
3,663,291.—CASCADE DEVELOPMENT. MAY 16, 1972.
3,678,896.—CONVEYOR SYSTEM. JULY 25, 1972. CAN. 0952465, GRB. 1325831.

Class 5D 1B

3,122,454.—XEROGRAPHIC DEVELOPING APPARATUS. FEB. 25, 1964.
3,435,803.—LIFTING APPARATUS. APR. 1, 1969. CAN. 0937394, FRA. 1511169, GRB. 1165378, ITL. 0788954, JAP. 0542586, MEX. 0095039.
3,448,724.—DEVELOPING APPARATUS. JUNE 10, 1969. ARG. 0174576, AUS. 0430081, BEL. 0726573, CAN. 0884214, CZC. 0157054, EGR. 0077413, FRA. 1598024, GRB. 1258781, ITL. 0854008, JAP. 0665972, MEX. 0107603, PNM. 0001429, RMN. 0054735, SAF. 0069179, SPN. 0362358, STZ. 0486057, SWD. 0338507, USR. 0410595, VZL. 0023716.
3,472,657.—XEROGRAPHIC DEVELOPMENT METHOD AND APPARATUS. OCT. 14, 1969. AUS. 0418178, BEL. 0680374, CAN. 0813843, FRA. 1477370, GRB. 1141167, ITL. 0766858, JAP. 0537665, MEX. 0091119, SWD. 0330833.
3,606,533.—XEROGRAPHIC DEVELOPMENT. SEPT. 20, 1971.
3,661,118.—ELECTROSTATIC DEVELOPMENT. MAY 9, 1972. CAN. 0951107.
3,695,224.—CASCADE DEVELOPMENT. OCT. 3, 1972.
3,835,811.—DEVELOPMENT APPARATUS FOR ELECTROPHOTOGRAPHIC PRINTING MACHINE. SEPT. 17, 1974.
3,888,578.—DEVELOPMENT APPARATUS FOR ELECTROPHOTOGRAPHIC PRINTING MACHINE. JUNE 10, 1975.
3,900,255.—PADDLE-WHEEL DEVELOPMENT SYSTEM. AUG. 19, 1975.

Class 5D 1C

2,880,696.—APPARATUS FOR DEVELOPING AN ELECTROSTATIC LATENT IMAGE. APR. 7, 1959. CAN. 0698394.
3,117,891.—XEROGRAPHIC APPARATUS. JAN. 14, 1964. CAN. 0740394, GRB. 1006078.
3,287,150.—CASCADE DEVELOPMENT PROCESS W/TWO-COMPONENT DEVELOPER. NOV. 22, 1966.
3,415,224.—MAGNETIC CASCADE DEV APPARATUS. DEC. 10, 1968. AUS. 0423497, BEL. 0725943, CAN. 0852660, COR. 000948A, FRA. 1603904, GRB. 1217281, ITL. 0849521, MRC. 0014726, PTG. 0051108, SAF. 0688440, SPN. 0361840, STZ. 0493872, SWD. 0345753, SYA. 0002440, ZMB. 0166972.
3,667,427.—CASCADE APPARATUS. JUNE 6, 1972. CAN. 0951112, GRB. 1377152.
3,678,897.—DEVELOPER MIXING APPARATUS. JULY 25, 1972. BEL. 0778426, CAN. 0951113, FRA. 7203212, GRB. 1377151, ITL. 0946909.
3,741,372.—CONVEYOR FOR DEVELOPER APPARATUS. JUNE 26, 1973.

Class 5D 1D

2,889,234.—XEROGRAPHIC DEVELOPMENT PROCESS. JUNE 2, 1959.
3,550,555.—XEROGRAPHIC DEVELOPER SEPARATION. DEC. 29, 1970. CAN. 0855652, GRB. 1238032.

Class 5D 2

3,105,770.—CASCADE DEVELOPMENT IMPROVEMENT. OCT. 1, 1963. AUS. 0252867, BEL. 0749545, CAN. 0746453, FRA. 1286397, GER. 1278244, GRB. 0986844, ITL. 0648862, JAP. 0517396.
3,375,807.—XEROGRAPHIC DEVELOPER. APR. 2, 1968. CAN. 0819049, MEX. 0092092, VZL. 0024448.
3,542,579.—ELECTROSTATIC IMAGE DEVELOPMENT. NOV. 24, 1970.

Class 5D 3

3,057,324.—XEROGRAPHIC DEVELOPING APPARATUS. OCT. 9, 1962.
3,336,905.—XEROGRAPHIC DEVELOPER APPARATUS. AUG. 22, 1967. CAN. 0793223, GRB. 1123059, JAP. 0508405.
3,428,025.—XEROGRAPHIC DEVELOPMENT APPARATUS-POWDER CLOUD BY CHARGE BREAKDOWN. DEC. 18, 1969.
3,638,610.—DEVELOPMENT APPARATUS. FEB. 1, 1972. CAN. 0916432, FRA. 7041622.
3,638,611.—ELECTRODED DEVELOPMENT DEVICE. FEB. 1, 1972. ARG. 0184658, ATR. 0308537, AUS. 0446323, BEL. 0752936, CAN. 0913893, CHL. 0025914, DNK. 0129305, EGR. 0084129, FRA. 7024067, GRB. 1258738, GUA. 0002615, IND. 0127311, ITL. 0900196, JAP. 0719143, MEX. 0115403, NOR. 0130134, NZL. 0160644, PLP. 0006288, PNM. 0002266, PTG. 0054072, SAF. 0704532, SPN. 0381383, STZ. 0520961, SWD. 0359386, TIW. 0005923, USR. 0414818.
3,682,132.—AUTOMATIC DEVELOPER CONTROLLER. AUG. 8, 1972.

Class 5D 4

3,347,691.—XEROGRAPHIC DEVELOPMENT. OCT. 17, 1967. ARG. 0168482, CAN. 0827608, FRA. 1497061, GRB. 1166464, ITL. 0788454, JAP. 0589492, MEX. 0093822, VZL. 0032595.
3,412,710.—CLEAN UP ELECTRODE. NOV. 26, 1968. BEL. 0704923, CAN. 0867283, FRA. 1540699, GRB. 1196637, ITL. 0814605, JAP. 0585018.
3,620,191.—BIASED INPUT CHUTE. NOV. 16, 1971. ARG. 0199542, ATR. 0324837, BEL. 0752943, CAN. 0918411, DNK. 0128800, EGR. 0083704, FRA. 7024665, GRB. 1310444, GUA. 0002727, IND. 0127313, ITL. 0900192, JAP. 0731612, MEX. 0114979, NOR. 0132115, NZL. 0160647, PLP. 0008638, PNM. 0002269, PTG. 0054075, SAF. 70/4534, SPN. 0381382, STZ. 0528761, SWD. 0359387, TIW. 0007164, USR. 0358874.
3,669,072.—DEVELOPER APPARATUS. JUNE 13, 1972. CAN. 0930539, GRB. 1343141.
3,682,538.—XEROGRAPHIC PICK-OFF PLATE. AUG. 8, 1972. ARG. 0186267, BEL. 0764562, CAN. 0935635, FRA. 7110750, GRB. 1349272, ITL. 0922348, MEX. 0119677, USR. 0426387.
3,682,677.—BACKGROUND REMOVAL. AUG. 8, 1972.
3,795,222.—DEVELOPMENT ELECTRODE SYSTEM. MAR. 5, 1974.
3,807,997.—PLURAL ELECTRODE DEVELOPMENT METHODS FOR LATENT ELECTROSTATIC IMAGES. APR. 30, 1974. CAN. 0979299, GRB. 1381910.
3,808,026.—LIQUID DEVELOPMENT OF ELECTROSTATIC LATENT IMAGE. APR. 30, 1974.
3,834,930.—METHOD OF DEVELOPING ELECTROSTATOGRAPHIC IMAGE. SEPT. 10, 1974.
3,907,695.—LIQUID DEVELOPER. SEPT. 23, 1975.

Class 5D 5

2,550,724.—APPARATUS FOR APPLYING POWDER TO AN ELECTROPHOTOGRAPHIC PLATE. MAY 1, 1951.
2,550,738.—APPARATUS FOR APPLYING POWDER TO AN ELECTROPHOTOGRAPHIC PLATE - TRAY WITH GATES. MAY 2, 1951.
2,635,046.—DEVELOPING DEVICE FOR ELECTROSTATIC IMAGES. APR. 14, 1953.
2,827,013.—ELECTROPHOTOGRAPHIC DEVELOPING DEVICE. MAR. 18, 1958.
3,223,548.—XEROGRAPHIC DEVELOPING MACHINE AND METHOD. DEC. 14, 1965.
3,316,878.—CASCADE DEVELOPING APPARATUS. MAY 2, 1967.

Class 5E

3,357,399.—COMBINED FLUIDIZED BED AND INVERTED CASCADE DEVELOPMENT APPARATUS. DEC. 12, 1967. ARG. 0171121, CAN. 0821473, CHL. 0022944, MEX. 0096075, PRU. 0009332, URG. 0008548, VZL. 0021060.
3,677,633.—PORTABLE DOCUMENT ABSTRACTOR. JULY 18, 1972.
3,738,832.—COLOR ELECTROPHOTOGRAPHIC PROCESS EMPLOYING LIQUID DEVELOPER CONTAINING GELATINAIN. JUNE 12, 1973.
3,748,126.—MULTIPLE COPY SELECTIVE RE-WETTING PRINTING. JULY 24, 1973.
3,748,127.—TREATMENT OF REUSABLE PHOTOCONDUCTIVE SURFACES WITH LEWIS ACIDS OR BASES. JULY 24, 1973.
3,776,631.—LIQUID DEVELOPER CLEANING SYSTEM. DEC. 4, 1973.

Class 5E

3,865,611.—METHOD FOR ELECTROSTATIC IMAGE DEVELOPMENT EMPLOYING TONER AND CARRIER SUPPORTED BY CONDUCTIVE. FEB. 11, 1975.
3,893,854.—PHOTOGRAPHIC ARTICLES WITH GAPS FOR PROCESSING FLUIDS. JULY 8, 1975.
3,918,809.—APPARATUS FOR CLEANING A SURFACE SUPPORT. NOV. 11, 1975.
3,927,934.—ELECTROSTATOGRAPHIC REPRODUCTION MACHINES. DEC. 23, 1975.
3,940,282.—BLADE CLEANING OF SURFACE WITH REVERSE MOVEMENT. FEB. 24, 1976.
3,973,699.—LIQUID DISPENSING APPARATUS UTILIZING DOUBLE ACTING PISTON. AUG. 10, 1976.
3,974,554.—QUANDRANGULAR TRIHETICORD GRAVURE ROLL. AUG. 17, 1976.

Class 5E 1

2,551,582.—METHOD OF PRINTING AND DEVELOPING SOLVENT IMAGES - ELECTROPHOTOGRAPHY. MAY 8, 1951.
2,965,482.—METHOD FOR FIXING XEROGRAPHIC IMAGES. DEC. 20, 1960.
3,005,726.—PROCESS OF DEVELOPING ELECTROSTATIC IMAGES. OCT. 24, 1961.

Class 5E 2

3,068,115.—ELECTROSTATIC EMULSION DEVELOPMENT. DEC. 11, 1962. GER. 1302344, GRB. 1006230, JAP. 0466442.
3,730,708.—ELECTROPHOTOGRAPHIC MULTI-COLOR PROCESS EMPLOYING LIQUID DEVELOPER. MAY 1, 1973.
3,776,723.—LIQUID TRANSFER ELECTROPHOTOGRAPHIC DEVELOPMENT PROCESS. DEC. 4, 1973.
3,862,618.—LIQUID DEVELOPING APPARATUS DEVELOPING AN ELECTROSTATIC IMAGE. JAN. 28, 1975.
3,960,444.—ELECTROPHOTOGRAPHIC PRINTING MACHINE. JUNE 1, 1976.

Class 5E 3

3,080,251.—METHOD OF XEROGRAPHIC DEVELOPMENT. MAR. 5, 1963.

Class 5E 4

3,010,842.—DEVELOPMENT OF ELECTROSTATIC IMAGES. NOV. 28, 1961. CAN. 0704604.
3,064,622.—IMMERSION DEVELOPMENT. NOV. 20, 1962. CAN. 0729544, FRA. 1296944, GER. 1190787, GRB. 0990968, JAP. 0451638.
3,129,115.—XEROGRAPHIC DEVELOPING APPARATUS. APR. 14, 1964. GRB. 1008004.
3,251,688.—LIQUID TRANSFER DEVELOPMENT. MAY 17, 1966. CAN. 0765523, FRA. 1362253, GRB. 1032013.
3,270,637.—ELECTROVISCOUS RECORDING. SEPT. 6, 1966. AUS. 0403009, CAN. 0740112, FRA. 1414126, GER. 1497109, GRB. 1086197, HOL. 0141644, ITL. 0738077, JAP. 0508403, NOR. 0127882, STZ. 0472710, SWD. 0331032.
3,281,241.—METHOD OF FORMING A VISUAL RECORD OF A LATENT IMAGE RECEIVING WEB. OCT. 25, 1966. AUS. 0275028, CAN. 0766420, FRA. 1362254, GER. 1303008, GRB. 1035236, ITL. 0699412, JAP. 0470426.
3,284,224.—CONTROLLED XEROGRAPHIC DEVELOPMENT. NOV. 8, 1966. CAN. 0751349, GRB. 1038801, JAP. 0640353.
3,334,613.—XEROGRAPHIC DEVELOPMENT APPARATUS. AUG. 8, 1967. CAN. 0787870, GRB. 1125628, JAP. 0546654.
3,369,918.—DEV OF LATENT ELECTROSTATIC IMGS W/ CREATED WAVES OF LIQUID DEVELOPER. FEB. 20, 1968.
3,576,623.—DEVELOPMENT SYSTEM EMPLOYING A CORONODE IMMERSED IN A LIQUID DEVELOPER. APR. 27, 1971. AUS. 0434437, CAN. 0872191, GER. 1908292, GRB. 1259880, JAP. 0675662.
3,577,259.—LIQUID DEVELOPMENT OF ELECTROSTATIC LATENT IMAGES UTILIZING A TONER-FREE ZONE. MAY 4, 1971.
3,592,678.—LIQUID DONOR DEVELOPMENT WITH ELECTROPHORETIC CLEANING. JULY 13, 1971.
3,620,800.—CLEANING LIQUID DEVELOPED ELECTROSTATIC IMAGES BY CONTACT WITH VAPORIZED CLEANING FLUID. NOV. 16, 1971. CAN. 0933997.
3,627,410.—REPRODUCTION APPARATUS WITH LIQUID. DEC. 14, 1971. CAN. 0886508.
3,627,557.—LIQUID DVLPMNT BY REDUCING VISCOSITY OF DVLPR ON ROLLER APPLICATION PRIOR TO DEVELOPMENT. DEC. 14, 1971.
3,628,981.—LIQUID TONER DEVELOPMENT. DEC. 21, 1971. ARG. 0181932.
3,642,471.—LIQUID DEVELOPING PROCESS IN AN ELECTROSTATOGRAPHIC IMAGING SYSTEM. FEB. 15, 1972.
3,642,515.—LIQUID DEVELOPMENT UTILIZING A CURVILINEAR DEVELOPMENT ELECTRODE. FEB. 15, 1972.
3,652,319.—CYCLIC IMAGING SYSTEM. MAR. 28, 1972. AUS. 0441527, BEL. 0761029, CAN. 0944010, FRA. 7047634, GRB. 1336739, ITL. 0913957, JAP. 0771819, SWD. 0363175.
3,656,948.—SELECTED REMOVAL OF LIQUID DVLPR IN CYCLICAL ELECTROPHOTOGRAPHIC PROCESS. APR. 18, 1972. CAN. 0906335, GRB. 1335054, JAP. 0760503.
3,671,290.—IMAGING SYSTEM. JUNE 20, 1972.
3,672,884.—ELECTROSTATIC PRINTING. JUNE 27, 1972.
3,692,520.—DVLPNG ELCTRSTIC IMGS EMPLYNG FATTY ACD ESTRS INHBT DVLPR BUILD-UP. SEPT. 19, 1972. CAN. 0940361, GRB. 1332674.
3,784,397.—IMAGING SYSTEM. JAN. 8, 1974.
3,800,744.—ELECTROSTATIC LATENT IMAGE DEVELOPING APPARATUS. APR. 2, 1974.
3,804,510.—IMAGING DEVELOPING SYSTEM. APR. 16, 1974.
3,808,025.—LIQUID DEVELOPING METHOD FOR ELECTROPHOTOGRAPHY. APR. 30, 1974.
3,816,114.—ELECTRO-PHOTOGRAPHIC METHOD. JUNE 11, 1974.
3,817,212.—ELECTROSTATOGRAPHIC LIQUID DEVELOPMENT APPARATUS. JUNE 18, 1974.
3,832,975.—ELECTROPHOTOGRAPHIC APPARATUS. SEPT. 3, 1974.
3,836,384.—IMAGING SYSTEMS. SEPT. 17, 1974.
3,841,893.—CHARGE CONTROL AGENTS FOR LIQUID DEVELOPERS. OCT. 15, 1974.
3,849,171.—METHOD FOR CLEANING BACKGROUND AREAS FROM DEVELOPED RECORDING SURFACES. NOV. 19, 1974. CAN. 0941882.
3,862,619.—ELECTRO-PHOTOGRAPHIC APPARATUS. JAN. 28, 1975.
3,864,125.—ELECTROPHOTOGRAPHIC METHOD OF MAKING AN IMAGING MASTER. FEB. 4, 1975.
3,870,514.—LIQUID DEVELOPMENT FOR THE ELECTRONIC PHOTOGRAPHY. MAR. 11, 1975.
3,877,934.—INDUCTION IMAGING WITH IN-PLACE DEVELOPMENT. APR. 15, 1975.

3,890,040.—INDUCTION IMAGING APPARATUS. JUNE 17, 1975.
3,913,524.—LIQUID DEVELOPING APPARATUS FOR ELECTROPHOTOGRAPHY. OCT. 21, 1975.
3,926,825.—LIQUID DEVELOPER COMPOSITION AND PROCESS FOR PREPARING SAME. DEC. 16, 1975.
3,931,792.—ABRASIVE LIQUID DEVELOPING APPARATUS. JAN. 13, 1976.
3,942,474.—DEVELOPING SYSTEMS. MAR. 9, 1976. ARG. 0181931, ATR. 0311971, AUS. 0457519, BEL. 0752802, CAN. 0904108, CHL. 0026275, EGR. 0084325, FRA. 7024068, GRB. 1320509, ITL. 0894828, JAP. 0815361, MEX. 0116454, SAF. 0704474, SPN. 0381297, STZ. 0513437, SWD. 0357269, TIW. 0006614.
3,943,268.—LIQUID DEVELOPER PROCESS AND APP FOR ELECTROSTATOGRAPHY. MAR. 9, 1976. CAN. 0904683.
3,965,861.—SEPARATED ROLLER LIQUID DEVELOPMENT. JUNE 29, 1976.
3,968,044.—MILLED LIQUID DEVELOPER. JULY 6, 1976.
3,971,659.—COLOR ELECTROPHOTOGRAPHIC PROCESS USING PHOTO CONDUCTIVE PARTICLES IN LIQUID DEVELOPER. JULY 27, 1976.
3,972,305.—IMAGING SYSTEM. AUG. 3, 1976. CAN. 0904683.

Class 5E 5

3,084,043.—LIQUID DEVELOPMENT OF ELECTROSTATIC LATENT IMAGES. APR. 2, 1963. CAN. 0678365, GRB. 0880597.
3,372,027.—XEROGRAPHIC LIQUID DEVELOPMENT. MAR. 5, 1968. CAN. 0800963, GRB. 1091169, ITL. 0760712, JAP. 0571175.
3,652,319.—CYCLIC IMAGING SYSTEM. MAR. 28, 1972. AUS. 0441527, BEL. 0761029, CAN. 0944010, FRA. 7047634, GRB. 1336739, ITL. 0913957, JAP. 0771819, SWD. 0363175.
3,667,428.—DEVELOPING SYSTEMS. JUNE 6, 1972. ARG. 0195534, ATR. 0312420, AUS. 0456202, BEL. 0752805, CAN. 0904107, CHL. 0026274, CZC. 0164275, DNK. 0126528, EGR. 0083514, FRA. 7024066, GRB. 1320232, ITL. 0894827, JAP. 0745765, MEX. 0114978, PNM. 0002541, SAF. 0704475, SPN. 0194607, STZ. 0543753, SWD. 0366126, TIW. 0006616, USR. 0420196.
3,676,215.—IMAGING SYSTEM. JULY 11, 1972. ARG. 0182525, AUS. 0430692, BEL. 0732139, CAN. 0900770, FRA. 6913232, GRB. 1272306, ITL. 0857440, JAP. 0698292, MEX. 0109289, PNM. 0001433, SPN. 0386902, SWD. 0352117, USR. 0309549.
3,692,520.—DVLPNG ELCTRSTIC IMGS EMPLYNG FATTY ACD ESTRS INHBT DVLPR BUILD-UP. SEPT. 19, 1972. CAN. 0940361, GRB. 1332674.
3,712,728.—REVERSAL DEVELOPMENT. JAN. 23, 1973. BEL. 0777718, CAN. 0949826, FRA. 7201004, GRB. 1374831, ITL. 0946351.
3,729,419.—LIQUID DEVELOPER. APR. 24, 1973.
3,772,012.—REVERSAL DEVELOPMENT USING POLAR LIQUID DEVELOPERS. NOV. 13, 1973. BEL. 0777718, CAN. 0949826, FRA. 7201004, GRB. 1374831, ITL. 0946351.
3,776,723.—LIQUID TRANSFER ELECTROPHOTOGRAPHIC DEVELOPMENT PROCESS. DEC. 4, 1973.
3,795,530.—ELECTROSTATIC LATENT IMAGE DEVELOPMENT. MAR. 5, 1974.
3,806,354.—METHOD OF DEVELOPING ELECTROSTATIC LATENT IMAGES. APR. 23, 1974.
3,817,748.—CONTRAST CONTROL IN ELECTROSTATIC COPYING UTILIZING LIQUID DEVELOPMENT. JUNE 18, 1974. GRB. 1406794.
3,834,930.—METHOD OF DEVELOPING ELECTROSTATOGRAPHIC IMAGE. SEPT. 10, 1974.
3,856,519.—TRANSFER OF TONER USING A VOLATILE INSULATING LIQUID. DEC. 24, 1974.
3,900,405.—CASSETTE OPENING MECHANISM. AUG. 19, 1975. CAN. 0926460, GRB. 1362697.
3,907,694.—NON-VOLATILE CONDUCTIVE INKS. SEPT. 23, 1975.
3,907,695.—LIQUID DEVELOPER. SEPT. 23, 1975.
3,918,400.—BLADE MOUNTING ASSEMBLIES. NOV. 11, 1975. BEL. 0816534.
3,918,807.—CLEANING BLADE FOR PHOTOCOPIER. NOV. 11, 1975.
3,942,349.—CROWN DIE FOR THREAD ROLLING OF APPLICATOR ROLLS. MAR. 9, 1976.
3,942,474.—DEVELOPING SYSTEMS. MAR. 9, 1976. ARG. 0181931, ATR. 0311971, AUS. 0457519, BEL. 0752802, CAN. 0904108, CHL. 0026275, EGR. 0084325, FRA. 7024068, GRB. 1320509, ITL. 0894828, JAP. 0815361, MEX. 0116454, SAF. 0704474, SPN. 0381297, STZ. 0513437, SWD. 0357269, TIW. 0006614.
3,954,640.—ELECTROSTATIC PRINTING INKS. MAY 4, 1976. BEL. 0816553.

Class 5E 4

3,970,043.—ELECTROPHOTOGRAPHIC DEVICE FOR LIQUID DEVELOPMENT. JULY 20, 1976.

Class 5F

2,843,084.—XEROGRAPHIC APPARATUS WITH ENDLESS DEVELOPMENT ELECTRODE. JULY 15, 1958.
2,844,123.—BELT DEVELOPMENT ELECTRODE. JULY 22, 1958.
2,880,699.—XEROGRAPHIC DEVELOPMENT. APR. 7, 1959.
2,895,847.—ELECTRIC IMAGE DEVELOPMENT. JULY 21, 1959. CAN. 0558894.
3,124,483.—APPARATUS FOR TRANSFERRING POWDER IMAGES AND METHOD THEREFOR. MAR. 10, 1964. CAN. 0843622.
3,166,432.—IMAGE DEVELOPMENT. JAN. 19, 1965. CAN. 0675704, FRA. 1260844, GER. 1185062, GRB. 0959668, JAP. 0401040.
3,203,394.—XEROGRAPHIC DEVELOPMENT APPARATUS. AUG. 31, 1965. CAN. 0757572, GRB. 1026704, JAP. 0464922.
3,216,844.—METHOD OF DEVELOPING ELECTROSTATIC IMAGES WITH PHOTOCONDUCTIBLE DONOR MEMBER. NOV. 9, 1965. CAN. 0794035, GRB. 1024983.
3,301,152.—XEROGRAPHIC COPYING APPARATUS. JAN. 31, 1967.
3,332,396.—XEROGRAPHIC DEVELOPING APPARATUS WITH CONTROLLED CORONA MEANS. JULY 25, 1967. AUS. 0287695, BEL. 0656893, CAN. 0775061, FRA. 1419973, GER. 1288915, GRB. 1060679, ITL. 0745583.
3,375,806.—XEROGRAPHIC DONOR DEVELOPMENT APPARATUS. APR. 2, 1968.
3,376,852.—DIELECTRIC BELT DEVELOPING. APR. 9, 1968. CAN. 0859028, GRB. 1214512, JAP. 0919364.
3,405,682.—XEROGRAPHIC DEVELOPMENT APPTS WITH WEB LOADING MEANS TO REMOVE RESIDUAL DEVELOPER. OCT. 15, 1968. GRB. 1102282.
3,606,864.—DONOR ASSEMBLY. SEPT. 21, 1971. CAN. 0903461, GRB. 1280951, MEX. 0116025.
3,613,636.—ELECTROGRAPHIC DEVELOPER. OCT. 19, 1971. GRB. 1282991.
3,635,196.—PNEUMATICALLY CONTROLLED SEAL. JAN. 18, 1972.
3,645,618.—VACUUM NOZZLE TO REMOVE AGGLOMERATES ON A TONER APPLICATOR. FEB. 29, 1972. CAN. 0949823.
3,696,783.—AUTOMATED TOUCHDOWN DEVELOPMENT SYSTEM. OCT. 10, 1972. CAN. 0949822, GRB. 1373666.
3,696,785.—DEVELOPMENT APPARATUS. OCT. 10, 1972. CAN. 0949824, GRB. 1373665.
3,697,169.—ELECTROSTATIC RECORDING APPARATUS AND METHOD. OCT. 10, 1972. CAN. 0954292, GRB. 1322681.
3,703,157.—MTHD/APPRTS FOR FRMNG UNFRM LYR OF PWDR DVELPR ON A SURFACE. NOV. 21, 1972.
3,707,389.—LATENT ELECTROSTATIC IMAGE DEVELOPMENT. DEC. 26, 1972. AUS. 0457281, BEL. 0777721, CAN. 0949827, FRA. 7201007, GRB. 1375048, ITL. 0946354.
3,729,334.—IMAGING PROCESS. APR. 24, 1973.
3,739,748.—DONOR FOR TOUCHDOWN DEVELOPMENT. JUNE 19, 1973.
3,759,222.—MICROFIELD DONOR WITH CONTINUOUSLY REVERSING MICROFIELDS. SEPT. 18, 1973. BEL. 0780091, CAN. 0951596, FRA. 7208102, GRB. 1385966, ITL. 0949779.
3,848,566.—DONOR APPARATUS. NOV. 19, 1974.
3,866,574.—XEROGRAPHIC DEVELOPING APPARATUS. FEB. 18, 1975.
3,881,927.—HALF TONE DEVELOPMENT PROCESS FOR TOUCHDOWN SYSTEM IN ELECTROSTATIC IMAGING. MAY 6, 1975. GRB. 1419926.
3,884,185.—COATED WIRE DEVELOPER BRUSH. MAY 20, 1975.
3,890,929.—XEROGRAPHIC DEVELOPING APPARATUS. JUNE 24, 1975.
3,893,418.—XEROGRAPHIC DEVELOPING APPARATUS. JULY 8, 1975.
3,914,460.—DEVELOPMENT UTILIZING ELECTRIC FIELDS. OCT. 21, 1975.
3,929,098.—TONER LOADING FOR TOUCHDOWN DONOR. DEC. 30, 1975.
3,970,042.—COLOR DEVELOPMENT APPARATUS. JULY 20, 1976.

Class 5G

3,380,437.—TRANSVERSELY RECIPROCATING FLUIDIZED BED DEVELOPMENT APPARATUS. APR. 30, 1968. ARG. 0179553, BRA. 0088502, CAN. 0821491, CHL. 0022941, CLB. 0016330, MEX. 0095936, PRU. 0009315, URG. 0008636, VZL. 0020996.

3,393,663.—FLUIDIZING ELECTRODE DEVELOPMENT APPARATUS. JULY 23, 1968. AUS. 0411962, BEL. 0701467, CAN. 0821472, CHL. 0024009, CLB. 0017645, CZC. 0157025, DNK. 0123998, EGR. 0072982, FRA. 1531274, GRB. 1193443, ISR. 0028298, ITL. 0805956, LXB. 0054062, NOR. 0127834, NZL. 0149432, PLD. 0069038, PTG. 0048069, SAF. 0674268, SPN. 0343103, STZ. 0481406, SWD. 0322414, USR. 0353449, VZL. 0021059.

3,396,700.—XEROGRAPHIC TONER DISPENSING APPARATUS. AUG. 13, 1968. CAN. 0852126, GRB. 1231868.

3,574,660.—ORBITAL DEVELOPER STREAM DEVELOPMENT. APR. 13, 1971. CAN. 0845076, GRB. 1193277.

3,641,977.—APPARATUS FOR AGITATING DEVELOPER MATERIAL WITHIN A HOUSING. FEB. 15, 1972. CAN. 0917405, GRB. 1342684.

3,682,137.—J-SHELL DEVELOPER HOUSING. AUG. 8, 1972. CAN. 0949820, GRB. 1342782.

3,900,001.—DEVELOPING APPARATUS. AUG. 19, 1975. CAN. 0970631, GRB. 1381049.

Class 5H

2,761,416.—DEVELOPMENT MECHANISM FOR ELECTROSTATIC IMAGES. SEPT. 4, 1956.

3,015,304.—ELECTROSTATIC IMAGE REPRODUCTION. JAN. 2, 1962. CAN. 0713395.

3,484,265.—TRANSVERSELY RECIPROCATING FLUIDIZED BED DEVELOPMENT METH. DEC. 16, 1969.

3,503,776.—XEROGRAPHIC DEVELOPMENT. MAR. 31, 1970. CAN. 0828694, FRA. 1511809, GRB. 1182291, ITL. 0793692, MEX. 0098765.

3,611,991.—VIBRATING BED DEVELOPING APPARATUS WITH ELECTROMAGNETIC DEVELOPER AGITATOR. OCT. 12, 1971. AUS. 0445409, BEL. 0755605, CAN. 0911707, EGR. 0083516, FRA. 7032503, GRB. 1264780, ITL. 0907435, JAP. 0745766, SPN. 0383333, STZ. 0521615, SWD. 0361956, TIW. 0007201, USR. 0371738.

3,613,637.—DEVELOPER FOR ELECTROSTATIC IMAGES. OCT. 19, 1971. AUS. 0448238, BEL. 0752034, CAN. 0911702, FRA. 7021987, GRB. 1301157, ITL. 0894180, SWD. 0358975.

3,621,816.—INTERLACED VIBRATING ELECTRODE. NOV. 23, 1971. CAN. 0914397, GRB. 1316614.

3,623,454.—FLUIDIZED BED DEVELOPMENT APPARATUS. NOV. 30, 1971. CAN. 0895208, GRB. 1272373, JAP. 0731616.

3,654,900.—FLUIDIZED DEVELOPMENT OF ELECTROSTATIC IMAGES. APR. 11, 1972. CAN. 0949821, GRB. 1357149.

3,685,486.—FLUIDIZED DEVELOPMENT APPARATUS. AUG. 22, 1972. CAN. 0921693, GRB. 1316306.

3,754,531.—FLUIDIZED DEVELOPMENT APPARATUS. AUG. 28, 1973.

3,844,252.—SHEET REMOVAL DEVICE. OCT. 29, 1974. BEL. 0814943, PNM. 0003193.

Class 5I

3,838,922.—APPARATUS FOR SENSING THE QUANTITY OF RECLAIMED DEVELOPER MATERIAL. OCT. 1, 1974. CAN. 0992600, GRB. 1414319.

3,841,265.—DEVELOPER ASSEMBLY FOR ELECTROSTATIC COPIER. OCT. 15, 1974.

3,844,252.—SHEET REMOVAL DEVICE. OCT. 29, 1974. BEL. 0814943, PNM. 0003193.

3,873,197.—APPARATUS FOR REGULATING THE TONER CONCENTRATION IN A ELECTROPHOTOGRAPHIC DEVICE. MAR. 25, 1975.

3,926,338.—THERMALLY INSENSITIVE PARTICLE CONCENTRATION CONTROLLER. DEC. 16, 1975.

Class 5I 1

3,316,875.—XEROGRAPHIC DEVELOPING APPARATUS. MAY 2, 1967.

3,331,355.—XEROGRAPHIC DEVELOPING APPARATUS. JULY 18, 1967. CAN. 0793224, FRA. 1465811, GRB. 1069351, ITL. 0778708.

3,349,750.—XEROGRAPHIC DEVELOPMENT APPARATUS. OCT. 31, 1967. CAN. 0819050, FRA. 1516053, GRB. 1165377, ITL. 0788953, JAP. 0547202, MEX. 0093862.

3,356,248.—CONTAINER WITH A ROTATABLE CLOSURE. DEC. 5, 1967. CAN. 0825091, GRB. 1166618.

3,550,556.—DEVELOPMENT APPARATUS. DEC. 29, 1970. ARG. 0180677, AUS. 0442279, BEL. 0726571, BRA. 6905449, CAN. 0882576, CZC. 0157055, EGR. 0076888, FRA. 1604314, GRB. 1252494, ITL. 0854006, JAP. 0731247, MEX. 0109983, PNM. 0001770, RMN. 0054558, SAF. 0069180, SPN. 0362037, STZ. 0498431, SWD. 0351059, USR. 0372851, VZL. 0023724.

3,661,118.—ELECTROSTATIC DEVELOPMENT. MAY 9, 1972. CAN. 0951107.

3,662,711.—DEVELOPMENT APPARATUS. MAY 16, 1972. CAN. 0945757, GRB. 1345253.

3,663,291.—CASCADE DEVELOPMENT. MAY 16, 1972.

3,687,270.—CONVEYOR ASSEMBLY. AUG. 29, 1972. CAN. 0952464, GRB. 1376231.

3,717,122.—MAGNETIC GATE. FEB. 20, 1973. CAN. 0960031, GRB. 1377023.

3,943,887.—HYBRID CROSSMIXER. MAR. 16, 1976.

3,947,107.—PARTIALLY SUBMERGED ACTIVE CROSSMIXER. MAR. 30, 1976. BEL. 0835370.

3,973,518.—CROSS MIXING BLENDING CHAMBER FOR ELECTROSTATIC PROCESSORS AND THE LIKE. AUG. 10, 1976.

Class 5I 2

3,941,280.—APPARATUS FOR CONTROLLING DEVELOPER EFFICIENCY. MAR. 2, 1976.

Class 5I 2A

2,750,922.—APPARATUS FOR DEVELOPING ELECTROPHOTOGRAPHIC PLATES. JUNE 19, 1956.

2,965,266.—XEROGRAPHIC TONER DISPENSER. DEC. 20, 1960.

3,122,455.—XEROGRAPHIC TONER DISPENSER. FEB. 25, 1964.

3,135,433.—XEROGRAPHIC TONER DISPENSING APPARATUS. JUNE 2, 1964. CAN. 0701240.

3,149,760.—POWDER DISPENSING APPARATUS. SEPT. 22, 1964.

3,250,439.—XEROGRAPHIC TONER DISPENSER. MAY 10, 1966. CAN. 0815453, GRB. 1126197, JAP. 0512654.

3,337,072.—LOADER. AUG. 22, 1967. CAN. 0825092, GRB. 1166619, JAP. 0605648.

3,385,500.—TONER PACKAGE. MAY 28, 1968. CAN. 0864337, GRB. 1189147, JAP. 0931680.

3,619,279.—TONER RECEIVING MEMBER. NOV. 9, 1971.

3,622,054.—TONER DISPENSER IMPROVEMENT. NOV. 23, 1971. CAN. 0911705.

3,722,471.—TONER METER DEVICE. MAR. 27, 1973. CAN. 0951108, GRB. 1370009.

3,740,288.—METHOD OF PREPARING A TONER DISPENSER. JUNE 19, 1973.

3,920,155.—PARTICLE LEVEL INDICATOR. NOV. 18, 1975.

3,941,470.—A TONER PARTICLE DISPENSER. MAR. 2, 1976.

3,954,331.—TONER DISPENSER. MAY 4, 1976.

Class 5I 2B

2,974,632.—DEVELOPER OF ELECTROSTATIC PHOTOGRAPHY. MAR. 14, 1961. CAN. 0704147.

3,389,863.—XEROGRAPHIC TONER DISPENSER. JUNE 25, 1968. CAN. 0835862, FRA. 1497062, GRB. 1171303, ITL. 0787552, JAP. 0589523, MEX. 0093821, VZL. 0024004.

3,390,664.—XEROGRAPHIC TONER DISPENSING APPARATUS. JULY 2, 1968. CAN. 0852124, GRB. 1208593.

3,619,279.—TONER RECEIVING MEMBER. NOV. 9, 1971.

Class 5I 2C

RE.27,876.—DISPENSING APPARATUS. JAN. 8, 1974. CAN. 0868818.

3,596,807.—DISPENSING APPARATUS—REISSUED D21848 RE.27,876. AUG. 3, 1971. CAN. 0868818.

3,956,108.—ANTI-PLUGGING DEVICE FOR AUTOMATIC DEVELOPABILITY CONTROL SYSTEMS. MAY 11, 1976.

3,958,878.—ELECTROSTATIC PROCESSOR HOUSING INTERCHANGEABLE RESERVOIRS FOR SUPPING AND RECLAIMING TONER. MAY 25, 1976.

3,974,944.—TONER DISPENSER. AUG. 17, 1976.

Class 5I 2C 1

RE.27,876.—DISPENSING APPARATUS. JAN. 8, 1974. CAN. 0868818.

3,013,703.—POWDER DISPENSING APPARATUS. DEC. 19, 1961. CAN. 0677935, GRB. 0938501, JAP. 0300276.
3,300,101.—TONER DISPENSER. JAN. 24, 1967. CAN. 0800856, GRB. 1152671, JAP. 0524530.
3,339,807.—TONER CONTAINER AND DISPENSER. SEPT. 5, 1967. CAN. 0842133, GRB. 1165953, JAP. 0547201.
3,396,700.—XEROGRAPHIC TONER DISPENSING APPARATUS. AUG. 13, 1968. CAN. 0852126, GRB. 1231868.
3,453,045.—XEROGRAPHIC DEVELOPMENT APPARATUS. JULY 1, 1969. CAN. 0852125, FRA. 1559973, GRB. 1213493, HUN. 0156188, ITL. 0832847, JAP. 0602169, USR. 0371739.
3,538,887.—ELECTROSCOPIC TONER POWDER DISPENSER. NOV. 10, 1970.
3,542,089.—TONER DISPENSER. NOV. 24, 1970. CAN. 0885916.
3,608,792.—APPARATUS FOR DISPENSING FINELY DIVIDED PARTICULATE MATERIAL. SEPT. 28, 1971. ARG. 0182132, ATR. 0311790, AUS. 0456817, BEL. 0745602, CAN. 0869923, CHL. 0025844, DNK. 0128336, FRA. 7003984, GRB. 1302401, GUA. 0002512, ITL. 0886722, MEX. 0119828, NZL. 0159117, PNM. 0002240, SAF. 0700806, SPN. 0376265, STZ. 0526801, SWD. 7001426, TIW. 0005927, VZL. 0032924.
3,654,900.—FLUIDIZED DEVELOPMENT OF ELECTROSTATIC IMAGES. APR. 11, 1972. CAN. 0949821, GRB. 1357149.
3,655,033.—VIBRATORY BOWL—TONER DISPENSER. APR. 11, 1972.
3,752,576.—TRANSPORT FOR PARTICULATE MATERIAL. AUG. 14, 1973.
3,896,279.—TNE LVL DETCTR ASSEMBLY INC MAGNETICLY RESPONSIVE SWITCH ACTUATD BY DFERENTL LOADED BLADE TYPE. JULY 22, 1975.
3,920,154.—TONER LEVEL DETECTOR. NOV. 18, 1975.

Class 5I 2C 2

3,094,049.—XEROGRAPHIC DEVELOPER MEASURING APPARATUS. JUNE 18, 1963.
3,348,522.—AUTOMATIC TONER CONTROL SYSTEM. OCT. 24, 1967. CAN. 0799397, GRB. 1135743, JAP. 0942998, MEX. 0089292.
3,348,523.—AUTOMATIC TONER CONTROL SYSTEM. OCT. 24, 1967. CAN. 0799399, GRB. 1139299, JAP. 5371200.
3,376,853.—ELECTROSTATIC TONER CONTROL. APR. 9, 1968. CAN. 0819051, GRB. 1177232, JAP. 0568731.
3,430,606.—ELECTROSCOPIC PARTICLE SENSOR. MAR. 4, 1969. CAN. 0891683, FRA. 1597321, ITL. 0866513, MEX. 0107599, PNM. 0001400, USR. 0336895, VZL. 0023727.
3,520,445.—DIELECTRIC LEVEL SENSOR. JULY 14, 1970. CAN. 0895527, GRB. 1239856.
3,526,338.—METHOD AND CONTROLLER FOR DISPENSING ELECTROSCOPIC MATERIAL—AUTOMATIC TONER DISPENSER CONTROL—24. SEPT. 1, 1970. ARG. 0181603, AUS. 0436922, BEL. 0726274, BRA. 6804852, CAN. 0895526, GRB. 1216690, ITL. 0866513, MEX. 0107687, PNM. 0001419, SPN. 0362036, SWD. 0355090, VZL. 0023723.
3,527,387.—DEVELOPER REPLENISHING PROGRAMMING SYSTEM. SEPT. 8, 1970. CAN. 0922772, GRB. 1233814, JAP. 0758340.
3,536,042.—XEROGRAPHIC DEVELOPMENT APPARATUS. OCT. 27, 1970.
3,604,939.—TONER SENSING APPARATUS—TONER SENSOR ASSEMBLY-GENIE. SEPT. 14, 1971. CAN. 0915751, GRB. 1260379, JAP. 0752502.
3,635,373.—AUTOMATIC DEVELOPABILITY CONTROL APPARATUS. JAN. 18, 1972. ARG. 0190708, AUS. 0445334, BEL. 0760748, CAN. 0923546, CHL. 0025916, EGR. 0091983, FRA. 7047630, GRB. 1336590, GUA. 0002624, ITL. 0913903, JAP. 0795149, MEX. 0116721, PNM. 0002092, SPN. 0386750, STZ. 0524843, SWD. 0362511, TIW. 0007197.
3,659,556.—PROGRAMMABLE TONER DISPENSER. MAY 2, 1972. BEL. 0771423, CAN. 0936681, FRA. 7130743, GRB. 1358448, ITL. 0934010.
3,692,403.—AUTOMATIC CONTROL OF TONER CONCENTRATIONS. SEPT. 19, 1972. CAN. 0979635, GRB. 1409578.
3,693,581.—TONER DISPENSER CIRCUIT FOR ELECTROSTATOGRAPHIC APPARATUS. SEPT. 26, 1972.
3,727,065.—AUTOMATIC DEVELOPABILITY CONTROL SYSTEM. APR. 10, 1973. ARG. 0185080, AUS. 0440458, BEL. 0757430, CAN. 0934806, CHL. 0025915, CZC. 0169811, FGR. 0086755, FRA. 7038235, GRB. 1318895, ITL. 0908953, JAP. 0795148, MEX. 0116873, PNM. 0002179, SPN. 0384593, STZ. 0514168, SWD. 0369114, TIW. 0007196, VZL. 0032004.
3,754,821.—AUTOMATIC DEVELOPMENT CONTROL. AUG. 28, 1973. ARG. 0195188, AUS. 0467463, BEL. 0793425, FRA. 7246724, GRB. 1411448, ITL. 0972845, JAP. 0552838, MEX. 0128209, NZL. 0169419, SAF. 7219030, SPN. 0410096, STZ. 0552838, SWD. 7216891, VZL. 0032066.
3,757,999.—AUTOMATIC DEVELOPABILITY CONTROL SYSTEM FOR ELECTROSTATIC RECORDING APPARATUS. SEPT. 11, 1973. ARG. 0185080, AUS. 0440458, BEL. 0757430, CAN. 0934806, CHL. 0025915, CZC. 0169811, EGR. 0086755, FRA. 7038235, GRB. 1318895, ITL. 0908953, JAP. 0795148, MEX. 0116873, PNM. 0002179, SPN. 0384593, STZ. 0514168, SWD. 0369114, TIW. 0007196, VZL. 0032004.
3,801,196.—TONER CONCENTRATION REGULATING APPARATUS. APR. 2, 1974.
3,814,516.—HUMIDITY COMPENSATED CONTROL DEVICE. JUNE 4, 1974.
3,825,337.—COLOR BALANCE DISPLAY. JULY 23, 1974.
3,834,806.—PARTICLE LEVEL INDICATOR. SEPT. 10, 1974.
3,872,825.—PARTICLE CONCENTRATION DETECTOR. MAR. 25, 1975.
3,893,408.—TONER DISPENSER SYSTEM. JULY 8, 1975.
3,894,799.—APPARATUS FOR MONITORING COPY QUALITY. JULY 15, 1975.
3,931,792.—ABRASIVE LIQUID DEVELOPING APPARATUS. JAN. 13, 1976.
3,936,176.—DEVICE FOR MAINTAINING A DEVELOPABILITY REGULATING APPARATUS CONTAMINANT FREE. FEB. 3, 1976.
3,960,444.—ELECTROPHOTOGRAPHIC PRINTING MACHINE. JUNE 1, 1976.

Class 5I 2C 2

3,498,500.—LEVEL SENSOR. MAR. 3, 1970. CAN. 0912851, GRB. 1251128.

Class 5I 2A

3,924,566.—REPRODUCTION MACHINE WITH MEANS FOR SOLIDIFYING THE RECLAIM TONER. DEC. 9, 1975.

Class 5J

3,804,510.—IMAGING DEVELOPING SYSTEM. APR. 16, 1974.
3,889,637.—SELF-BIASED DEVELOPMENT ELECTRODE AND REPRODUCING MACHINE EMPLOYING SAME. JUNE 17, 1975. FRA. 7422700.
3,893,415.—DEVELOPING APPARATUS. JULY 8, 1975. ARG. 0204387, BEL. 0789238, BRA. 0088405, CAN. 0991394, FRA. 7232380, GRB. 1409815, ITL. 0970948, MEX. 0128578, SPN. 0408654, STZ. 0554551, SWD. 7214863.
3,908,037.—IMAGE DEVELOPING TECHNIQUES. SEPT. 23, 1975. CAN. 0980181, GRB. 1406292.
3,965,861.—SEPARATED ROLLER LIQUID DEVELOPMENT. JUNE 29, 1976.

Class 5J 1

2,690,394.—ELECTROPHOTOGRAPHY. SEPT. 28, 1954.
2,777,418.—METHOD AND APPARATUS FOR DEVELOPING AN IMAGE ON A XEROGRAPHIC PLATE. JAN. 15, 1957. CAN. 0587719.
2,876,737.—APPARATUS FOR DEVELOPING ELECTROSTATIC IMAGES ON SHEET MATERIAL. MAR. 10, 1959.
3,011,473.—XEROGRAPHIC APPARATUS. DEC. 5, 1961. CAN. 0675698, GRB. 0971972.
3,091,219.—XEROGRAPHIC DEVELOPING APPARATUS. MAY 28, 1963.
3,147,147.—XEROGRAPHIC DEVELOPING APPARATUS AND ELECTRODE. SEPT. 1, 1964. CAN. 0738918, GRB. 1007167.
3,241,466.—ELECTROSTATIC PHOTOGRAPHY. MAR. 22, 1966.
3,424,131.—ELECTRODED CASCADE DEVELOPMENT SYSTEM. JAN. 28, 1969. CAN. 0848084, FRA. 1463050, GRB. 1123618, ITL. 0729637, JAP. 0499007.
3,606,863.—DEVELOPMENT ELECTRODE. SEPT. 21, 1971. CAN. 0905099, GRB. 1296756, JAP. 0774497.
3,611,992.—CLEANUP ELECTRODE. OCT. 12, 1971. CAN. 0916431.

3,642,515.—LIQUID DEVELOPMENT UTILIZING A CURVILINEAR DEVELOPMENT ELECTRODE. FEB. 15, 1972.
3,648,658.—DEVELOPING APPARATUS. MAR. 14, 1972.
3,651,784.—LOW POTENTIAL DEVELOPMENT ELECTRODE. MAR. 28, 1972. CAN. 0917900.
3,670,700.—DEVELOPMENT ELECTRODE. JUNE 20, 1972. ARG. 0185528, ATR. 0324836, AUS. 0445848, BEL. 0752935, CAN. 0916430, CHL. 0025837, DNK. 0126729, EGR. 0085926, FRA. 7024671, GRB. 1304065, IND. 0127310, ITL. 0900194, JAP. 0731613, MEX. 0115164, NOR. 0131437, NZL. 0160642, PLP. 0006295, PNM. 0001951, PTG. 0054071, SAF. 0704531, SPN. 0381380, STZ. 0513439, SWD. 0358976, TIW. 0007161, USR. 0503555, VZL. 30684.
3,741,156.—XEROGRAPHIC DEVELOPMENT APPARATUS. JUNE 26, 1973.
3,778,144.—XEROGRAPHIC DEVELOPMENT ELECTRODE APPARATUS. DEC. 11, 1973. CAN. 0972550, GRB. 1393144.
3,784,299.—DARK DECAY RETARDATION. JAN. 8, 1974.
3,790,397.—RETONING CARRIER BEADS IN THE DEVELOPMENT ZONE. FEB. 5, 1974.
3,795,222.—DEVELOPMENT ELECTRODE SYSTEM. MAR. 5, 1974.
3,816,114.—ELECTRO-PHOTOGRAPHIC METHOD. JUNE 11, 1974.
3,817,212.—ELECTROSTATOGRAPHIC LIQUID DEVELOPMENT APPARATUS. JUNE 18, 1974.
3,832,975.—ELECTROPHOTOGRAPHIC APPARATUS. SEPT. 3, 1974.
3,955,976.—DEVELOPING METHOD IN ELECTROPHOTOGRAPHY-DEVELOPING METHOD IN ELECTROPHOTOGRAPHY. MAY 11, 1976. GRB. 1329143.

Class 5J 2

2,784,694.—SEGMENTED DEVELOPMENT ELECTRODE. MAR. 12, 1957. CAN. 0564484.
3,416,494.—XEROGRAPHIC DEVELOPMENT ELECTRODE. DEC. 17, 1968. CAN. 0882575, GRB. 1249664, JAP. 0653014.
3,621,816.—INTERLACED VIBRATING ELECTRODE. NOV. 23, 1971. CAN. 0914397, GRB. 1316614.

Class 5J 3

2,952,241.—DEVELOPER ELECTRODE FOR ELECTROPHOTOGRAPHIC APPARATUS. SEPT. 13, 1960.
3,349,676.—XEROGRAPHIC DEVELOPMENT ELECTRODE APPARATUS. OCT. 31, 1967. CAN. 0814087, FRA. 1473662, GRB. 1144766, ITL. 0764006, JAP. 0513609, MEX. 0090133.

Class 5J 4

2,911,944.—XEROGRAPHIC DEVELOPMENT APPARATUS. NOV. 10, 1959. CAN. 0603099.
2,942,573.—XEROGRAPHIC DEVELOPING APPARATUS. JUNE 28, 1960. CAN. 0701146, GRB. 0930072.
3,062,178.—XEROGRAPHIC DEVELOPING APPARATUS. NOV. 6, 1962.
3,105,777.—XEROGRAPHIC DEVELOPING APPARATUS. OCT. 1, 1963. CAN. 0700762.

Class 5J 5

2,784,109.—METHOD FOR DEVELOPING ELECTROSTATIC IMAGES. MAR. 5, 1957. CAN. 0558593, GRB. 0698994.
2,873,721.—MICRO-MANIFOLD FOR POWDER CLOUD DEVELOPMENT. FEB. 17, 1959.
3,284,224.—CONTROLLED XEROGRAPHIC DEVELOPMENT. NOV. 8, 1966. CAN. 0751349, GRB. 1038801, JAP. 0640353.
3,438,705.—AUTOMATIC XEROGRAPHIC DEVELOPMENT CONTROL. APR. 15, 1969. GRB. 1207830.
3,611,982.—DEVELOPMENT ELECTRODE CONTROL APPARATUS. OCT. 12, 1971. ARG. 0185532, AUS. 0450067, BEL. 0755383, BRA. 0088402, CAN. 0913353, CHL. 0025834, EGR. 0090283, FRA. 7032350, GRB. 1303148, ITL. 0901777, JAP. 0758461, MEX. 0117918, PNM. 0002245, SPN. 0383058, STZ. 0523526, SWD. 0361750, TIW. 0007514, USR. 0473382, VZL. 0032598.
3,696,784.—XEROGRAPHIC DEVELOPMENT APPARATUS. OCT. 10, 1972. BEL. 0776601, CAN. 0951109, FRA. 7146241, GRB. 1369648, ITL. 0943905.
3,719,169.—PLURAL ELECTRODE DEVELOPMENT APPARATUS. MAR. 6, 1973. CAN. 0979299, GRB. 1381910.
3,784,397.—IMAGING SYSTEM. JAN. 8, 1974.
3,788,739.—IMAGE COMPENSATION METHOD AND APPARATUS FOR ELECTROPHOTOGRAPHIC DEVICES. JAN. 29, 1974.
3,805,739.—CONTROLLING MULTIPLE VOLTAGE LEVELS FOR ELECTROSTATIC PRINTING. APR. 23, 1974. CAN. 0972552, GRB. 1382710.
3,810,165.—ELECTRONIC DISPLAY DEVICE. MAY 7, 1974.
3,815,988.—IMAGE DENSITY CONTROL APPARATUS. JUNE 11, 1974. BEL. 0815209, SAF. 0743132.
3,818,864.—IMAGE DEVELOPING APPARATUS. JUNE 25, 1974. CAN. 0980181, GRB. 1406292.
3,888,666.—REVERSAL DEVELOPING METHOD USING PHOTOCONDUCTIVE DEVELOPING ELECTRODE. JUNE 10, 1975.
3,889,637.—SELF-BIASED DEVELOPMENT ELECTRODE AND REPRODUCING MACHINE EMPLOYING SAME. JUNE 17, 1975. FRA. 7422700.

Class 5J 3

3,866,572.—FORAMINOUS ELECTROSTATOGRAPHIC TRANSFER SYSTEM. FEB. 18, 1975. BEL. 0815546.

Class 5K

2,598,732.—ELECTROPHOTOGRAPHY. JUNE 3, 1952.
3,212,889.—XEROGRAPHIC CONTRAST CONTROL. OCT. 19, 1965. GRB. 1008897.
3,251,685.—METHOD OF CONTROLLING CONTRAST IN A XEROGRAPHIC REPRODUCTION PROCESS. MAY 17, 1966. CAN. 0707047, GER. 1265583, JAP. 0446813.
3,540,806.—HALF TONING METH AND APPARATUS FOR SOLID AREA COVERAG. NOV. 17, 1970. CAN. 0892754, GRB. 1253888.
3,707,947.—CROSS-CHANNEL MIXER. JAN. 2, 1973. ARG. 0200109, ATR. 0322982, AUS. 0457444, BEL. 0776661, CAN. 0946145, CHL. 0027259, DNK. 0132048, EGR. 0099026, FRA. 7145340, GRB. 1372731, ITL. 0943876, MEX. 0127352, PNM. 0002585, SAF. 0718308, SPN. 0397852, STZ. 0557554, TIW. 0005832, USR. 0402245.
3,808,026.—LIQUID DEVELOPMENT OF ELECTROSTATIC LATENT IMAGE. APR. 30, 1974.
3,817,748.—CONTRAST CONTROL IN ELECTROSTATIC COPYING UTILIZING LIQUID DEVELOPMENT. JUNE 18, 1974. GRB. 1406794.
3,865,080.—TONER PICKOFF APPARATUS. FEB. 11, 1975.
3,865,612.—XEROGRAPHIC DEVELOPMENT METHOD. FEB. 11, 1975.
3,887,367.—METHOD FOR TEMPERATURE STABILIZING PHOTORECEPTORS. JUNE 3, 1975.
3,889,637.—SELF-BIASED DEVELOPMENT ELECTRODE AND REPRODUCING MACHINE EMPLOYING SAME. JUNE 17, 1975. FRA. 7422700.
3,893,413.—XEROGRAPHIC DEVELOPING APPARATUS. JULY 8, 1975.
3,911,865.—TONER PICKOFF APPARATUS. OCT. 14, 1975.
3,946,920.—VACUUM SYSTEM CONTROL. MAR. 30, 1976.
3,960,444.—ELECTROPHOTOGRAPHIC PRINTING MACHINE. JUNE 1, 1976.
3,965,861.—SEPARATED ROLLER LIQUID DEVELOPMENT. JUNE 29, 1976.

Class 5L

2,901,374.—DEVELOPMENT OF ELECTROSTATIC IMAGE AND APPARATUS THEREFOR. AUG. 25, 1959. CAN. 0565027.
3,245,823.—ELECTROSTATIC IMAGE DEVELOPMENT APPARATUS. APR. 12, 1966.
3,926,824.—ELECTROSTATOGRAPHIC DEVELOPER COMPOSITION. DEC. 16, 1975. ARG. 0192480, AUS. 0466319, BEL. 0793098, CAN. 0985552, FRA. 7245403, GRB. 1417179, ITL. 0973327, STZ. 0028663.

Class 5M

2,817,598.—CONTINUOUS TONE REVERSAL DEVELOPMENT PROCESS. DEC. 24, 1957. CAN. 0574108, FRA. 1146729, GER. 1026620, GRB. 0813915, JAP. 0247824.
3,712,728.—REVERSAL DEVELOPMENT. JAN. 23, 1973. BEL. 0777718, CAN. 0949826, FRA. 7201004, GRB. 1374831, ITL. 0946351.
3,772,012.—REVERSAL DEVELOPMENT USING POLAR LIQUID DEVELOPERS. NOV. 13, 1973. BEL. 0777718, CAN. 0949826, FRA. 7201004, GRB. 1374831, ITL. 0946351.
3,800,744.—ELECTROSTATIC LATENT IMAGE DEVELOPING APPARATUS. APR. 2, 1974.

3,877,963.—REVERSAL LIQUID DEVELOPING USING A DEVELOPMENT ELECTRODE AND CORONA CHARGING. APR. 15, 1975.
3,888,666.—REVERSAL DEVELOPING METHOD USING PHOTOCONDUCTIVE DEVELOPING ELECTRODE. JUNE 10, 1975.
3,901,698.—METHOD OF REVERSAL DEVELOPMENT USING TWO ELECTROSTATIC DEVELOPERS. AUG. 26, 1975.

Class 5N

2,822,779.—DEVELOPER FOR ELECTROSTATIC PHOTOGRAPHY. FEB. 11, 1958. CAN. 0560056.
3,907,693.—LIQUID DEVELOPER FOR ELECTROPHOTOGRAPHY. SEPT. 23, 1975.
3,907,694.—NON-VOLATILE CONDUCTIVE INKS. SEPT. 23, 1975.
3,954,640.—ELECTROSTATIC PRINTING INKS. MAY 4, 1976. BEL. 0816553.
3,963,486.—ELECTROPHOTOGRAPHIC IMAGING PROCESS EMPLOYING EPOXY-ESTER CONTAINING LIQUID DEVELOPER. JUNE 15, 1976.

Class 5N 1A

2,919,247.—TRIPARTITE DEVELOPER FOR ELECTROSTATIC IMAGES. DEC. 29, 1959. CAN. 0565006.
2,965,573.—XEROGRAPHIC DEVELOPER. DEC. 20, 1960. CAN. 0612918, GRB. 0934406.
3,609,082.—ELECTROSTATIC DEV PARTICLS CONTAING RESIN, COLORANT, METAL SALT AND PHTHALATE. SEPT. 28, 1971. ARG. 0165457, BAH. 0000094, BOL. 3389B, CAN. 0902985, CHL. 0023567, CLB. 0017680, DOR. 0001462, ECD. 0000168, ELS. 0001065. JAM. 0001897, MEX. 0100808, PNM. 0002016, PRU. 0009862, TRK. 0015594, URG. 0009288.
3,720,617.—AN ELECTROSTATIC DEVELOPER CONTAINING MODIFIED SILICON DIOXIDE PARTICLES. MAR. 13, 1973. ARG. 0189666, ATR. 0321104, AUS. 0463862, BEL. 0767359, CAN. 0941212, CHL. 0026780, EGR. 0093928, FRA. 7118950, GRB. 1347318, ITL. 0926884, MEX. 2131403, NZL. 0163670, PNM. 0002393, PRU. 0011824, STZ. 0567746, SWD. 0366402, TIW. 0006149, USR. 0460634, VZL. 0032423.
3,819,367.—IMAGING SYSTEM. JUNE 25, 1974. ARG. 0189666, ATR. 0321104, AUS. 0463862, BEL. 0767359, CAN. 0941212, CHL. 0026780, EGR. 0093928, FRA. 7118950, GRB. 1347318, ITL. 0926884, MEX. 0131403, NZL. 0163670, PNM. 0002393, PRU. 0011824, STZ. 0567746, SWD. 0366402, TIW. 0006149, USR. 0460634, VZL. 0032423.
3,820,986.—LIQUID DEVELOPMENT METHOD AND MATERIALS. JUNE 28, 1974.
3,833,364.—METHOD OF DEVELOPING ELECTROSTATIC IMAGE CHARGE. SEPT. 3, 1974.
3,850,830.—LIQUID DEVELOPER CONTAINING EXTENDER BODY PARTICLES. NOV. 26, 1974.
3,900,588.—NON-FILMING DUAL ADDITIVE DEVELOPER. AUG. 19, 1975. BEL. 0825924.

Class 5N 1B

3,013,890.—PROCESS OF DEVELOPING ELECTROSTATIC IMAGES AND COMPOSITION THEREFOR. DEC. 19, 1961. AUS. 0243022, CAN. 0812526, FRA. 1251476, GER. 1129511, GRB. 0944401, ITL. 0620433, JAP. 0313573.
3,577,345.—SOLID XEROGRAPHIC DEVELOPER. MAY 4, 1971. ARG. 0172448, ATR. 0325417, AUS. 0424173, BEL. 0716084, BOL. 003270B, CAN. 0902983, CHL. 0025923, CLB. 0017674, DOR. 0001461, ELS. 0001064, FRA. 1567731, GRB. 1232117, GRK. 0037628, GUA. 0002003, HOL. 0148714, IND. 0116209, ISR. 0030116, ITL. 0851653, JAM. 0001848, JAP. 0623002, LXB. 0056197, MEX. 0119320, NOR. 0131653, NZL. 0164353, PNM. 0002062, PRU. 0009911, PTG. 0049749, SPN. 0354686, STZ. 0516180, SWD. 0338238, TIW. 0005096, TRC. 0000057, TRK. 0015620, URG. 0009286, VZL. 0023666.
3,590,000.—SOLID DEVELOPER FOR LATENT ELECTROSTATIC IMAGES. JUNE 29, 1971. ARG. 0172453, ATR. 0288860, BAH. 0000093, BEL. 0716083, BOL. 3399B, CAN. 0902984, CHL. 0024050, DOR. 0001460, ECD. 0000198, ELS. 0001062, FRA. 1567721, GER. 1772570, GRB. 1232118, GRK. 0037629, GUA. 0002095, IND. 0116210, ISR. 0030117, ITL. 0851651, JAM. 0002094, JAP. 0655407, LXB. 0056196, MEX. 0104566, NZL. 0164356, PLP. 0007690, PNM. 0002083, PRU. 0009495, PTG. 0049748, SPN. 0354685, STZ. 0519737, SWD. 0357071, TIW. 0004940, TRC. 0000058, TRK. 0015606, URG. 0009287, VZL. 0032392.
3,609,082.—ELECTROSTATIC DEV PARTICLS CONTAING RESIN, COLORANT, METAL SALT AND PHTHALATE. SEPT. 28, 1971. ARG. 0165457, BAH. 0000094, BOL. 3389B, CAN. 0902985, CHL. 0023567, CLB. 0017680, DOR. 0001462, ECD. 0000168, ELS. 0001065, JAM. 0001897, MEX. 0100808, PNM. 0002016, PRU. 0009862, TRK. 0015594, URG. 0009288.
3,635,704.—IMAGING SYSTEM. JAN. 18, 1972. ALB. 0004133, ARG. 0176978, ATR. 0303521, AUS. 0440759, BEL. 0727560, BRA. 0088093, BUR. 0000042, CAM. 0000463, CAN. 0867697, CHL. 0026254, COR. 000949A, DNK. 0131403, EGR. 0078899, EIR. 0032632, FRA. 6902174, GNR. 0000042, GRB. 1259514, GRK. 0039240, IND. 0119583, ISR. 0031503, ITL. 0871510, LAS. 0000199, LIB. 00P7269, MEX. 0106332, MLG. 0003056, MLW. 00MW869, MNC. 8156975, MRC. 0014724, NZL. 0155208, PAK. 0120859, PLP. 0008511, PNM. 0001676, PRU. 0010443, PTG. 0051063, RHD. 4169529, RMN. 0055464, SAF. 0069995, SPN. 0363127, STZ. 0513431, SWD. 0342921, SYA. 0002477, TGR. 0000551, TIW. 0005257, UAR. 0009525, USR. 0396887, VTM. 0001805, VZL. 0023744, ZMB. 0186974.
3,652,319.—CYCLIC IMAGING SYSTEM. MAR. 28, 1972. AUS. 0441527, BEL. 0761029, CAN. 0944010, FRA. 7047634, GRB. 1336739, ITL. 0913957, JAP. 0771819, SWD. 0363175.
3,653,893.—IMAGING SYSTEM. APR. 4, 1972.
3,655,374.—IMAGING PROCESS EMPLOYING NOVEL SOLID DEVELOPER MATERIAL. APR. 11, 1972.
3,681,107.—DEVELOPMENT OF ELECTROSTATOGRAPHIC IMAGES. AUG. 1, 1972.
3,748,127.—TREATMENT OF REUSABLE PHOTOCONDUCTIVE SURFACES WITH LEWIS ACIDS OR BASES. JULY 24, 1973.
3,856,692.—LIQUID ELECTROSTOGRAPHIC DEVELOPER COMPOSITIONS. DEC. 24, 1974. CAN. 0940361, GRB. 1332674.
3,900,588.—NON-FILMING DUAL ADDITIVE DEVELOPER. AUG. 19, 1975. BEL. 0825924.
3,900,589.—AN ELECTROSTATOGRAPHIC IMAGING PROCESS. AUG. 19, 1975. AUS. 0467835, BEL. 0802879, GRB. 1437041.
3,948,654.—ELECTROSTATOGRAPHIC PROCESS. APR. 6, 1976.

Class 5N 2

2,618,551.—DEVELOPER FOR ELECTROSTATIC IMAGES. NOV. 18, 1952. AUS. 0148642, CAN. 0495360, GER. 0926587, GRB. 0686466, STZ. 0292431, SWD. 0161100.
2,618,552.—DEVELOPMENT OF ELECTROPHOTOGRAPHIC IMAGES. NOV. 18, 1952.
2,638,416.—DEVELOPER COMPOSITION FOR DEVELOPING AN ELECTROSTATIC LATENT IMAGE. MAY 12, 1953. AUS. 0149163, BEL. 0488778, CAN. 0507733, FRA. 0985322, GER. 0833608, GRB. 0679715, HOL. 0084987, ITL. 0453731, JAP. 0191247, SAF. 0007764, STZ. 0286147, SWD. 0150223.
3,844,815.—FORON YELLOW AS A TONER COLORANT. OCT. 29, 1974. BEL. 808754.

Class 5N 2A

3,723,114.—THERMOSETTING ELCTRSTGRPHC DVLPR OF CARRIER/PREPOLYMER OF DIALLYL PHTHALATE ISOPHTHALATE AND MXTR. MAR. 27, 1973. ARG. 0185089, BEL. 0762507, CAN. 0970195, FRA. 7104349, GRB. 1344197, ITL. 0918244, MEX. 0122234.
3,806,339.—LIQUID DEVELOPER COMPOSITION. APR. 23, 1974.
3,903,320.—ELECTROSTATOGRAPHIC DEVELOPMENT METHOD FOR PRESSURE FIXABLE TONERS. SEPT. 2, 1975.
3,909,259.—COLOR ELECTROPHOTOGRAPHIC IMAGING PROCESS UTILIZING SPECIFIC CARRIER-TOWER COMBINATIONS. SEPT. 30, 1975. GRB. 1435218.
3,942,979.—IMAGING SYSTEM. MAR. 9, 1976.
3,965,021.—ELECTROSTATOGRAPHIC DEVELOPMENT-POLYBLEND TONERS. JUNE 22, 1976.
3,969,251.—DEVELOPER MIXTURE. JULY 13, 1976.

Class 5N 2A 1

RE.25,136.—ELECTROSTATIC DEVELOPER COMPOSITION AND METHOD THEREFOR-RE OF 2,940,934-D432. MAR. 13, 1962.
2,788,288.—RHEINFRANK JJ JONES WD. APR. 9, 1957. CAN. 0550574, GRB. 0768293.

2,892,794.—ELECTROSTATIC DEVELOPER AND TONER. JUNE 30, 1959.
3,079,342.—ELECTROSTATIC DEVELOPER COMPOSITION AND METHOD THEREFOR. FEB. 26, 1963. ARG. 0157131, CAN. 0726134, GUA. 0001817.

Class 5N 2A 2

2,659,670.—METHOD OF DEVELOPING ELECTROSTATIC IMAGES. NOV. 17, 1953.
2,753,308.—XEROGRAPHY DEVELOPER COMPOSITION. JULY 3, 1956.

Class 5N 2B

3,533,835.—ELECTROSTATOGRAPHIC DEVELOPER MIXTURE. OCT. 13, 1970. ARG. 0181296, AUS. 0417746, BEL. 0704918, CAN. 0900769, CHL. 0024909, CLB. 0017825, FRA. 1540695, GRB. 1211865, IND. 0112449, ITL. 0814857, MEX. 0100137, PRU. 0009323, SWD. 0323583, URG. 0009011, VZL. 0023668.
3,591,503.—ELECTROSTATOGRAPHIC DEVELOPER. JULY 6, 1971. ARG. 0172143, ATR. 0287491, AUS. 0418556, BEL. 0713751, CAN. 0879020, CHL. 0024256, CLB. 0017933, FRA. 1560849, GRB. 1225980, GRK. 0038397, IND. 0115457, ITL. 0833710, LXB. 0055904, MEX. 0111625, NOR. 0128297, NZL. 0152196, PLP. 0008847, PRU. 0009319, PTG. 0049455, SAF. 0682386, SPN. 0352810, STZ. 0508903, SWD. 0333868, URG. 0009139, VZL. 0023688.
3,595,794.—ELECTROSTATOGRAPHIC DEVELOPER. JULY 27, 1971. ARG. 0169109, ATR. 0290986, AUS. 0418156, BEL. 0713752, CAN. 0879021, CHL. 0024482, FRA. 1582855, GRB. 1227471, IND. 0115458, ITL. 0883043, LXB. 0055894, MEX. 0115899, NOR. 0128036, NZL. 0152195, PLP. 0007966, PRU. 0009335, PTG. 0049154, SAF. 0682358, SPN. 0352811, STZ. 0505410, SWD. 0331633, URG. 0009283, VZL. 0023687.
3,627,522.—DEVELOPER COMPOSITION AND METHOD OF USE. DEC. 14, 1971.
3,672,928.—ELECTROSTATOGRAPHIC DEVELOPERS HAVING CARRIERS COMPRISING POLYSTER COATED CORES. JUNE 27, 1972. ARG. 0184669, BEL. 0762415, CAN. 0941209, FRA. 7103845, GRB. 1344365, ITL. 0918191, JAP. 0764506.
3,704,066.—REFLEX ESPOSURE MEDIUM. NOV. 28, 1972.
3,725,283.—ELECTROSTATOGRAPHIC DEVELOPER CONTAINING UNCOATED GLASS CERAMIC CARRIER PARTICLES. APR. 3, 1973. BEL. 0777720, CAN. 0973745, FRA. 7201006, GRB. 1376457, ITL. 0946358.
3,767,578.—CARRIER MATERIAL FOR ELECTROSTATOGRAPHIC. OCT. 23, 1973. ARG. 0198052, ATR. 0322978, AUS. 0461667, BEL. 0784452, CAN. 0986351, CHL. 0027640, FRA. 7220690, GRB. 1397445, ITL. 0959791, MEX. 0127643, SPN. 0403664, STZ. 0546969, TIW. 0006042, VZL. 0032064.
3,847,604.—ELECTROSTATIC IMAGING PROCESS USING MODULAR CARRIERS. NOV. 12, 1974. ARG. 0198052, ATR. 0322978, AUS. 0461667, BEL. 0784452, CAN. 0986351, CHL. 0027640, FRA. 7220690, GRB. 1397445, ITL. 0959791, MEX. 0127643, SPN. 0403664, STZ. 0546969, TIW. 0006042, VZL. 0032064.
3,849,127.—AN ELECTROSTATOGRAPHIC PROCESS IN WHICH COATED CARRIER PARTICLES ARE USED. NOV. 19, 1974.
3,857,792.—ELECTROSTATIC DEVELOPER MIXTURE WITH A COATED CARRIER. DEC. 31, 1974.
3,914,181.—ELECTROSTATOGRAPHIC DEVELOPER MIXTURES COMPRISING FERRITE CARRIER BEADS. OCT. 21, 1975. ARG. 0194244, BEL. 0785913, GRB. 1398871, ITL. 0962400, MEX. 0126285, SPN. 0404423, VZL. 0032940.
3,923,503.—ELECTROSTATIC LATEN IMAGE DEVELOPMENT EMPLOYING STEEL CARRIER PARTICLES. DEC. 2, 1975. ARG. 0181848, ATR. 0316987, AUS. 0456820, BAH. 0000162, BEL. 0752230, CAN. 0940360, CHL. 0025833, EGR. 0095180, FRA. 7021985, GRB. 1312806, ITL. 0894287, JAP. 0728825, MEX. 0121681, NOR. 0131364, NZL. 0160479, PNM. 0002264, PTG. 0053978, SAF. 0704155, SPN. 0380913, STZ. 0548625, SWD. 0351058, TIW. 0006837, USR. 0457235.
3,926,824.—ELECTROSTATOGRAPHIC DEVELOPER COMPOSITION. DEC. 16, 1975. ARG. 0192480, AUS. 0466319, BEL. 0793098, CAN. 0985552, FRA. 7245403, GRB. 1417179, ITL. 0973327, STZ. 0028663.
3,939,086.—HIGHLY CLASSIFIED OXIDIZED DEVELOPER MATERIAL. FEB. 17, 1976. ARG. 0181848, ATR. 0316987, AUS. 0456820, BAH. 0000162, BEL. 0752230, CAN. 0940360, CHL. 0025833, EGR. 0095180, FRA. 7021985, GRB. 1312806, ITL. 0894287, JAP. 0728825, MEX. 0121681, NOR. 0131364, NZL. 0160479, PNM. 0002264, PTG. 0053978, SAF. 0704155, SPN. 0380913, STZ. 0548625, SWD. 0351058, TIW. 0006837, USR. 0457235.
3,942,979.—IMAGING SYSTEM. MAR. 9, 1976.
3,969,251.—DEVELOPER MIXTURE. JULY 13, 1976.

Class 5N 3

2,891,011.—DEVELOPER FOR ELECTROSTATIC IMAGES. JUNE 16, 1959.

Class 5N 4

3,467,634.—ORGANOSILICON TERPOLYMERS AND PROCESS. SEPT. 16, 1969. ARG. 0165758, AUS. 0417109, BEL. 0702403, CAN. 0857389, FRA. 1534183, GRB. 1200756, HOL. 0826202, ITL. 0826202, JAP. 0671041, MEX. 0100136, NOR. 0125392, SPN. 0343902, STZ. 0484210, SWD. 0339752, VZL. 0025437.
3,526,533.—COATED CARRIER PARTICLES. SEPT. 1, 1970. ARG. 0161341, AUS. 0418867, BEL. 0702404, CAN. 0878413, FRA. 1534184, GRB. 1205051, ITL. 0826203, JAP. 0578401, MEX. 0120334, NOR. 0122818, SPN. 0343903, STZ. 0486054, SWD. 0308987, VZL. 0032393.
3,533,835.—ELECTROSTATOGRAPHIC DEVELOPER MIXTURE. OCT. 13, 1970. ARG. 0181296, AUS. 0417746, BEL. 0704918, CAN. 0900769, CHL. 0024909, CLB. 0017825, FRA. 1540695, GRB. 1211865, IND. 0112449, ITL. 0814857, MEX. 0100137, PRU. 0009323, SWD. 0323583, URG. 0009011, VZL. 0023668.
3,713,819.—XEROGRAPHIC IMAGING AND DEVELOPMENT USING METAL OXIDE CARRIER PART. JAN. 30, 1973.
3,730,707.—METHOD OF DEVELOPING LATENT IMAGES. MAY 1, 1973.
3,752,666.—ELECTROSTATIC IMAGING PROCESS USING CARRIER BEADS CONTAINING CONDUCTIVE PARTICLES. AUG. 14, 1973.
3,833,366.—CARRIER COMPOSITIONS. SEPT. 3, 1974. BEL. 0748633, CAN. 0904641, FRA. 7012584, GRB. 1319787, ITL. 0899337, JAP. 0709043.
3,839,029.—ELECTROSTATOGRAPHIC DEVELOPMENT WITH FERRITE DEVELOPER MATERIALS. OCT. 1, 1974. ARG. 0194244, BEL. 0785913, GRB. 1398871, ITL. 0962400, MEX. 0126285, SPN. 0404423, VZL. 0032940.
3,849,182.—HIGHLY SHAPE-CLASSIFIED OXIDIZED LOW CARBON HYPEREUTECTOID ELECTROSTATOGRAPHIC STEEL CARRIER PA. NOV. 19, 1974. ARG. 0181848, ATR. 0316987, AUS. 0456820, BAH. 0000162, BEL. 0752230, CAN. 0940360, CHL. 0025833, EGR. 0095180, FRA. 7021985, GRB. 1312806, ITL. 0894287, JAP. 0728825, MEX. 0121681, NOR. 0131364, NZL. 0160479, PNM. 0002264, PTG. 0053978, SAF. 0704155, SPN. 0380913, STZ. 0548625, SWD. 0351058, TIW. 0006837, USR. 0457235.
3,850,663.—CELLULOSE COATED CARRIERS. NOV. 26, 1974. ARG. 0183677, AUS. 0458322, BEL. 0763987, CAN. 0941210, EGR. 0091603, FRA. 7108585, GRB. 1345027, ITL. 0922292, MEX. 0120027, PNM. 0002440, SAF. 0711547, STZ. 0557050, SWD. 0359940, TIW. 0008177, VZL. 0032931.
3,850,676.—COATED CARRIER PARTICLES FOR ELECTROSTATOGRAPHIC DEVELOPMENT. NOV. 26, 1974.
3,900,587.—IMAGING PROCESS EMPLOYING TREATED CARRIERS PARTICLES. AUG. 19, 1975.
3,903,320.—ELECTROSTATOGRAPHIC DEVELOPMENT METHOD FOR PRESSURE FIXABLE TONERS. SEPT. 2, 1975.
3,916,064.—DEVELOPER MATERIAL. OCT. 28, 1975.
3,916,065.—ELECTROSTATOGRAPHIC CARRIER PARTICLES. OCT. 28, 1975.
3,929,657.—STOICHIOMETRIC FERRITE CARRIERS. DEC. 30, 1975. BEL. 0819535.
3,945,823.—ELECTROSTATOGRAPHIC REVERSAL DEVELOPMENT WITH DEVELOPER COMPRISING POLY(P-XYLYLENE) COATED CARR. MAR. 23, 1976. BEL. 0807597, MEX. 0133543.

Class 5N 5

3,788,994.—PRESSURE FIXABLE ELECTROSTATOGRAPHIC TONER. JAN. 29, 1974. ARG. 0200575, BEL. 0793247, CAN. 0985943, FRA. 7244381, GRB. 1406687, ITL. 0973323, STZ. 0028529, VZL. 0032608.
3,804,764.—ELECTROSTATOGRAPHIC PRESSURE SENSITIVE POLYMERIC TONER. APR. 16, 1974. ARG. 0196320, AUS. 0464392, BEL. 0793554, FRA. 7246575, GRB. 1417409, ITL. 0973325, STZ. 0028568.

3,853,778.—TONER COMPOSITION EMPLOYING POLYMER WITH SIDE CHAIN CRYSTALLINITY. DEC. 10, 1974. AUS. 0465653, BEL. 0793639, FRA. 7246888, GRB. 1423291, ITL. 0973330, SPN. 0410267.
3,893,932.—PRESSURE FIXABLE TONER. JULY 8, 1975.
3,893,934.—SOLID DEVELOPER FOR ELECTROSTATIC LATENT IMAGES. JULY 8, 1975.
3,974,078.—AN ELECTROSTATE GRAPHIC DEVELOPMENT OF ENCAPSULATED MATERIALS. AUG. 10, 1976. ARG. 0196318, AUS. 0467046, BEL. 0792115, FRA. 7239134, ITL. 0973326, MEX. 0128788, STZ. 0028567, VZL. 0033139.

Class 5N 5A

3,729,419.—LIQUID DEVELOPER. APR. 24, 1973.
3,804,619.—COLOR ELECTROPHOTOGRAPHIC IMAGING PROCESS. APR. 16, 1974. GRB. 1435218.
3,836,244.—COLOR XEROGRAPHY. SEPT. 17, 1974.
3,841,893.—CHARGE CONTROL AGENTS FOR LIQUID DEVELOPERS. OCT. 15, 1974.
3,897,249.—TONERS FOR PHTHALOCYANINE PHOTORECEPTORS. JULY 29, 1975.
3,909,259.—COLOR ELECTROPHOTOGRAPHIC IMAGING PROCESS UTILIZING SPECIFIC CARRIER-TONER COMBINATIONS. SEPT. 30, 1975. GRB. 1435218.

Class 5N 5B

3,080,250.—SELF-TACKIFYING XEROGRAPHIC TONER. MAR. 5, 1963.
3,080,318.—THREE-COMPONENT XEROGRAPHIC TONER. MAR. 5, 1963.

Class 5N 6

3,755,177.—PROCESS OF MAKING LIQUID ELECTROSTATIC DEVELOPERS CONTAINING GELATIN. AUG. 28, 1973.
3,908,046.—P-XYLYENE VAPOR PHASE POLYMERIZATION COATING OF ELECTROSTATOGRAPHIC PARTICLES. SEPT. 23, 1975.

Class 5N 6A

3,507,686.—METHOD OF COATING CARRIER BEADS. APR. 21, 1970. CAN. 0872190, GRB. 1239621, JAP. 0675782.
3,658,500.—METHOD OF PRODUCING GLASS BEADS FOR ELECTROSTATOGRAPHIC DEVELOPERS. APR. 25, 1972. CAN. 0916536, GRB. 1331485.
3,685,113.—DEVELOPER SYSTEM. AUG. 22, 1972. ARG. 0183679, BEL. 0764635, CAN. 0941211, FRA. 7110751, GRB. 1347568, ITL. 0922132, MEX. 0122432.
3,764,310.—METHOD OF PRODUCING ELECTROSTATOGRAPHIC DEVELOPER. OCT. 9, 1973.
3,789,796.—APPARATUS FOR PRODUCING DEVELOPER MATERIALS. FEB. 5, 1974.
3,940,514.—METHOD OF COATING ELECTROSTATOGRAPHIC CARRIER PARTICLES. FEB. 24, 1976.

Class 5N 6B

2,862,889.—DEAGGLOMERATOR. DEC. 2, 1958.
3,326,848.—SPRAY DRIED LATEX TONERS. JUNE 20, 1967. AUS. 0409084, BEL. 0666056, CAN. 0866260, FRA. 1451366, GRB. 1115653, ITL. 0717377, MEX. 0088140, SWD. 0340046.
3,338,991.—METHOD OF FORMING ELECTROSTATIC TONER PARTICLES. AUG. 29, 1967. FRA. 1450642, GRB. 1115634, HOL. 0142251, ITL. 0717378.
3,502,582.—IMAGING SYSTEMS. MAR. 24, 1970. ARG. 0171952, BEL. 0726571, CAN. 0873934, FRA. 1569382, GRB. 1237095, ITL. 0835554, MEX. 0100704, VZL. 0032414.
3,740,334.—PROCESS OF PREPARING SOLID DEVELOPERS FOR ELECTROSTATIC LATENT IMAGES. JUNE 19, 1973.
3,830,750.—ENCPSLING SBSTNLY SLUBL PRTN OF CORE MATL IN SBSTNLY SLBLE SHELL MATL OF DFRNT SOLUBLTY. AUG. 20, 1974. AUS. 0466018, BEL. 0793246, CAN. 0983328, GRB. 1411954, ITL. 0973317, SPN. 0410224, STZ. 0028527.
3,893,933.—PROCESS FOR PRODUCING ENCAPSULATED TONER COMPOSITION. JULY 8, 1975.
3,968,044.—MILLED LIQUID DEVELOPER. JULY 6, 1976.

Class 5N 2A

3,900,800.—HIGH VOLTAGE AMPLIFIER. AUG. 19, 1975.

Class 5N 2A 1

3,239,465.—XEROGRAPHIC DEVELOPER. MAR. 8, 1966. CAN. 0630295, GRB. 0952166.

Class 5N 2A 2

3,239,465.—XEROGRAPHIC DEVELOPER. MAR. 8, 1966. CAN. 0630295, GRB. 0952166.

Class 5N 4

3,947,371.—DEVELOPER MATERIAL WITH POLY-P-XYLYLENE- COATED CARRIER. MAR. 30, 1976. BEL. 0807597, MEX. 0133543.

Class 5N 5A

3,900,800.—HIGH VOLTAGE AMPLIFIER. AUG. 19, 1975.

Class 5O

3,641,981.—APPARATUS FOR CONTROLLING DEVELOPER CHARGE LEVEL. FEB. 15, 1972. CAN. 0914006, GRB. 1338417.
3,654,901.—TONER RECLAIMING SYSTEM. APR. 11, 1972. ATR. 0321720, AUS. 0459286, BEL. 0754425, CAN. 0941881, DNK. 0130262, EGR. 0085711, FRA. 7029147, GRB. 1325455, IND. 0127847, ITL. 0901160, NOR. 0130609, PLP. 0008671, PTG. 0054272, SAF. 0705408, SPN. 0382437, STZ. 0513441, SWD. 0361533, TIW. 0006725, USR. 0373974.
3,664,297.—CENTRIFUGAL DEVELOPMENT APPARATUS AND METHOD. MAY 23, 1972. GRB. 1315565, JAP. 0719144.
3,809,012.—DEVELOPER SEAL. MAY 7, 1974. CAN. 0984133.
3,872,826.—DEVELOPMENT SYSTEM SEAL. MAR. 25, 1975.
3,893,415.—DEVELOPING APPARATUS. JULY 8, 1975. ARG. 0204387, BEL. 0789238, BRA. 0088405, CAN. 0991394, FRA. 7232380, GRB. 1409815, ITL. 0970948, MEX. 0128578, SPN. 0408654, STZ. 0554551, SWD. 7214863.
3,906,899.—DEVELOPER SEAL. SEPT. 23, 1975.
3,915,121.—DEVELOPMENT APPARATUS. OCT. 28, 1975.
3,924,566.—REPRODUCTION MACHINE WITH MEANS FOR SOLIDIFYING THE RECLAIM TONER. DEC. 9, 1975.

Class 5O 4

3,900,405.—CASSETTE OPENING MECHANISM. AUG. 19, 1975. CAN. 0926460, GRB. 1362697.

Class 5P

3,649,262.—SIMULTANEOUS DEVELOPMENT-CLEANING OF SAME AREA OF AN ELECTROSTATOGRAPHIC IMAGE SUPPORT SURFACE. MAR. 14, 1972. BEL. 0743661, CAN. 0916232, FRA. 6944511, GRB. 1296997, ITL. 0882670, USR. 0358873.

Class 6

3,753,560.—AUXILIARY SHEET FEEDER-MULTI STATION AUXILIARY PAPER FEEDER-2400. AUG. 21, 1973. AUS. 0466179, BEL. 0793641, FRA. 7300150, GRB. 1402971, ITL. 0973328, SPN. 0410322.
3,833,790.—HEATED PRESSURE FUSING SYSTEM. SEPT. 3, 1974.

Class 6A

3,104,873.—PAPER SUPPLY TRAY. SEPT. 24, 1963. CAN. 0699129, GRB. 1016553.
3,153,534.—PAPER SUPPLY TRAY. OCT. 20, 1964.
3,154,356.—PAPER CATCH TRAY. OCT. 27, 1964. CAN. 0726574, GRB. 1032952, JAP. 0497185.
3,405,635.—PAPER SUPPORT TRAY FOR REPRODUCTION MACHINES. OCT. 15, 1968.
3,406,964.—ADJUSTABLE PACK HOLDER. OCT. 22, 1968. CAN. 0848822, GER. 1270049, GRB. 1158671, JAP. 0914623.
3,415,510.—AUXILIARY SHEET FEEDER. DEC. 10, 1968. CAN. 0831412, GRB. 1235158.
3,458,187.—SHEET HOLDER. JULY 29, 1969. CAN. 0879560, GRB. 1199947.
3,599,966.—SHEET HANDLING APPARATUS. AUG. 17, 1971. CAN. 0921504, JAP. 783765.

3,601,394.—SHEET RETAINING APPARATUS. AUG. 24, 1971. ARG. 0195162, AUS. 0437722, BEL. 0752940, CAN. 0966521, CHL. 0026165, CZC. 0164276, EGR. 0085710, FRA. 7024668, GRB. 1312304, ITL. 0900198, JAP. 0803409, MEX. 0116509, PNM. 0002170, SPN. 0381385, STZ. 0547747, SWD. 0361648, TIW. 0005745, USR. 0493985.
3,651,933.—COPY SHEET PACKAGE. MAR. 28, 1972.
3,687,448.—SHEET FEEDING APPARATUS. AUG. 29, 1972. CAN. 9782161, GRB. 1373810.
3,847,385.—SHEET CONTAINER. NOV. 12, 1974. CAN. 0991208.
3,847,388.—SHEET STACKING METHOD AND APPARATUS. NOV. 12, 1974. FRA. 7344220.
3,848,988.—MOISTURE CONTROL DEVICE. NOV. 19, 1974.
3,857,558.—PAPER CASSETTE DESIGN WITH IRREGULAR BOTTOM. DEC. 31, 1974.
3,883,133.—MOVABLE PACK ADVANCER. MAY 13, 1975.
3,907,283.—SENSING SHEETS ON A SUPPORT SURFACE. SEPT. 23, 1975.
3,921,972.—SHEET STACK RECEPTACLE. NOV. 25, 1975.
3,926,519.—CONTROL DEVICE FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. DEC. 16, 1975.
3,934,870.—SHEET FEEDING DEVICES. JAN. 27, 1976.
3,936,044.—ADJUSTABLE SHEET GUIDE. FEB. 3, 1976.
3,957,366.—SHEET FEEDING APPARATUS. MAY 18, 1976.

Class 6A 1

3,100,111.—SHEET FEED MECHANISM. AUG. 6, 1963. ARG. 0162642, CAN. 0683564, GRB. 1032956, IND. 0096309, JAP. 0478677.
3,301,551.—SHEET FEED MECHANISM. JAN. 31, 1967. CAN. 0811029, JAP. 0639312.
3,378,254.—PACK ADVANCER. APR. 16, 1968. CAN. 0815409, GER. 1289850, GRB. 1129872, JAP. 0615872.
3,402,928.—SHEET HANDLING APPARATUS. SEPT. 24, 1968. CAN. 0871575, GRB. 1203615, JAP. 0602168.
3,558,127.—SHEET HANDLING APPARATUS. JAN. 26, 1971. ARG. 0180315, AUS. 0443480, BEL. 0741889, CAN. 0928826, FRA. 6939710, GRB. 1282910, ITL. 0878226, MEX. 0112773, SPN. 0373541, SWD. 6915742.
3,630,517.—COUNTER STACKER. DEC. 28, 1971.
3,768,806.—BI-DIRECTIONALLY MOVABLE PLATFORM CONTROL. OCT. 30, 1973. CAN. 0992113, GRB. 1403040.
3,820,777.—ELEVATOR ASSEMBLY POSITIONING CONTROL. JUNE 28, 1974. BEL. 0802196, GRB. 1416470.
3,898,425.—FUSING APPARATUS. AUG. 5, 1975.

Class 6B

3,847,388.—SHEET STACKING METHOD AND APPARATUS. NOV. 12, 1974. FRA. 7344220.
3,958,989.—TRANSPARENCY SUPPORT MATERIAL FOR ELECTROPHOTOGRAPHIC PROCESS. MAY 25, 1976. BEL. 0815634.

Class 6B 1

2,945,434.—SHEET FEED MECHANISM. JULY 19, 1960. CAN. 0693829.
3,062,533.—PAPER FEED APPARATUS. NOV. 6, 1962. CAN. 0712936.
3,062,534.—SHEET FEED MECHANISM. NOV. 6, 1962. GRB. 1016700.
3,083,962.—SHEET STRIPPER. APR. 2, 1963. ARG. 0165468, CAN. 0712935, GRB. 1032958, IND. 0096311, JAP. 0484728.
3,104,872.—EDGE DRAG DEVICE. SEPT. 24, 1963. CAN. 0699594.
3,241,830.—SHEET FEED MECHANISM. MAR. 22, 1966. ATR. 0276087, AUS. 0295720, CAN. 0765301, DNK. 0126493, EIR. 0028650, GER. 1197326, GRB. 1089538, ISR. 0030228, NZL. 0148732, STZ. 0457511.
3,251,594.—SHEET FEED MECHANISM. MAY 17, 1966. AUS. 0416589, CAN. 0785164, DNK. 131.557, EIR. 0029758, GRB. 1122623, ISR. 0034134, JAP. 0499006, NOR. 0125806, SWD. 0358480.
3,276,770.—SHEET FEEDING APPARATUS. OCT. 4, 1966. CAN. 0788346, FRA. 1459041, GER. 1237587, GRB. 1055215, ITL. 0726800, JAP. 0537118.
3,288,460.—PAPER FEED MECHANISM. NOV. 29, 1966. ATR. 0300566, CAN. 0792617, GRB. 1135746, JAP. 0630911, STZ. 0509924.
3,288,461.—SHEET FEEDING APPARATUS. NOV. 29, 1966. CAN. 0856098, GER. 1249887, GRB. 1123260, JAP. 0562385.
3,300,206.—ELECTRICALLY ENERGIZED CLUTCH FOR SHEET FEED CONTROL MECHANISM. JAN. 24, 1967. CAN. 0788344, GRB. 1135745, MEX. 0112221, STZ. 0513063.
3,406,960.—PAPER HANDLING APPARATUS. OCT. 22, 1968. CAN. 0907683, GRB. 1202218.
3,425,685.—PAPER FEED MECHANISM. FEB. 4, 1969. BEL. 0708498, CAN. 0847744, FRA. 1552327, GRB. 1165279, ITL. 0819625, JAP. 0972609, MEX. 0105134.
3,469,834.—SHEET FEEDER AND SEPARATOR APPARATUS. SEPT. 30, 1969. ARG. 0168907, CAN. 0847743, CHL. 0023614, CLB. 0017683, JAM. 0001852, MEX. 0102646, PRU. 0009339, URG. 0008981, VZL. 0023673.
3,524,639.—AUTOMATIC FEEDING DEVICE. AUG. 18, 1970. CAN. 0895184, FRA. 6906418, GRB. 1254784, ITL. 0875431.
3,537,703.—MANIFOLD SHEET SEPARATING DEVICE. NOV. 3, 1970. CAN. 0923351, GRB. 1261077.
3,556,516.—SELF-ALIGNING FEED ROLLER. JAN. 19, 1971. CAN. 0899392, GRB. 1256265.
3,565,421.—FEEDING SYSTEM. FEB. 23, 1971.
3,567,214.—SHEET FEEDING AND SEPARATING APPARATUS. MAR. 2, 1971. BEL. 0734128, CAN. 0902124, FRA. 6919122, GER. 1929105, GRB. 1263193, ITL. 0866188, SPN. 0368173, STZ. 0501501, SWD. 6908176.
3,578,317.—SHEET CONVEYOR APPARATUS FOR AUTOMATIC COPYING MACHINE. MAY 11, 1971. ARG. 0193800, ATR. 0307233, AUS. 0446229, BEL. 0750390, CAN. 0907682, EGR. 0082423, FRA. 7017317, GRB. 1284832, ITL. 0893096, JAP. 783766, MEX. 0117916, NZL. 0160102, SPN. 0379652, STZ. 0516404, SWD. 0361952, TIW. 0006833, VZL. 0025781.
3,580,565.—SHEET FEEDING APPARATUS. MAY 25, 1971.
3,592,462.—GATED PAPER SNUBBER. JULY 13, 1971. CAN. 0923922.
3,601,389.—SHEET FEEDING APPARATUS. AUG. 24, 1971. ARG. 0184657, BEL. 0752939, CAN. 0912055, CHL. 0026164, FRA. 7024666, GRB. 1306595, GUA. 0002508, ITL. 0907152, MEX. 0114977, PNM. 0002212, TIW. 0006720, VZL. 0032784.
3,618,752.—STACK OF IMAGE RECEIVING MEMBERS. NOV. 9, 1971.
3,655,183.—SHEET FEED APPARATUS. APR. 11, 1972.
3,664,663.—PAPER CASSETTE LOADING DEVICE. MAY 23, 1972. CAN. 0951342, GRB. 1351766.
3,713,645.—SHEET SEPARATING APPARATUS. JAN. 30, 1973. CAN. 0957392.
3,727,910.—SHEET SEPARATOR APPARATUS. APR. 17, 1973. CAN. 0956660, GRB. 1391198.
3,731,915.—FEED ROLL ABRASION ROLLER. MAY 8, 1973. ARG. 0194272, BEL. 0791064, CAN. 0966518, FRA. 7239549, GRB. 1389426, ITL. 0970223.
3,768,803.—SHEET FEEDER. OCT. 30, 1973. ARG. 0197314, BEL. 0795206, CAN. 0966158, GRB. 1413541, ITL. 0978938, SPN. 0411475.
3,773,316.—SHEET FEEDER DRIVE MECHANISM. NOV. 20, 1973. GRB. 1424580.
3,861,670.—SHEET FEEDING APPARATUS. JAN. 21, 1975. GRB. 1435762.
3,866,901.—REVERSE BUCKLE FEEDER. FEB. 18, 1975.
3,873,084.—PAPER FEEDER. MAR. 25, 1975.
3,893,663.—REVERSE BUCKLE SHEET FEEDING APPARATUS. JULY 8, 1975.
3,895,791.—BOTTOM SHEET FEEDER USING SEPARATION BELT AND RETARD PAD. JULY 22, 1975.
3,934,869.—SHEET SEPARATING AND FEEDING APPARATUS. JAN. 27, 1976. GER. 7439833.
3,947,018.—UNIVERSAL FEEDER-STACKER. MAR. 30, 1976. BEL. 0836262.
3,966,189.—TOGGLING RETARD PAD. JUNE 29, 1976.

Class 6B 2

3,378,255.—PAPER HANDLING APPARATUS. APR. 16, 1968. CAN. 0836939, FRA. 1527333, GRB. 1181271, ITL. 0804517, JAP. 1052342, MEX. 0099951.
3,547,431.—PNEUMATIC CUT SHEET FEEDER. DEC. 15, 1970.

Class 6B 1

3,936,046.—FRONT AND SIDE SHEET REGISTERING APPARATUS. FEB. 3, 1976.
3,941,373.—FLOATING GATE SHEET SEPARATOR. MAR. 2, 1976.

Class 6C

3,120,446.—METHOD OF TRANSFERRING A DEVELOPED SOLID PARTICULATE IMAGE. FEB. 4, 1964.

3,519,124.—ARTICLE TO FACILITATE FEEDING OF IMAGE RECEIVING SHEETS. JULY 7, 1970. CAN. 0941879, FRA. 1568821, GRB. 1216347, ITL. 0870563.
3,589,809.—FEEDING SYSTEM. JUNE 29, 1971.
3,630,514.—SHEET FEEDING APPARATUS. DEC. 28, 1971. ARG. 0186214, AUS. 0452075, BEL. 0751309, CAN. 0921948, FRA. 7019460, GRB. 1253503, ITL. 0893690, JAP. 783764, MEX. 0117507, SPN. 0380270, STZ. 0511759, SWD. 0363621, TIW. 0006836, USR. 0466680.
3,645,615.—COPYING APPARATUS. FEB. 29, 1972. ARG. 0185529, AUS. 0445849, BEL. 0752941, CAN. 0925927, CHL. 0025888, FRA. 7024670, GRB. 1312305, GUA. 0002324, ITL. 0900200, MEX. 0115165, PNM. 0002260, SPN. 0381387, STZ. 0525778, SWD. 7009063, TIW. 0007163, VZL. 0032783.

Class 6C 1

3,902,421.—METHOD FOR FORMING A PICTURE IMAGE. SEPT. 2, 1975.

Class 6D

2,065,383.—PHOTOCOPY MACHINE. DEC. 22, 1936.
2,265,975.—PHOTO-COPY MACHINE. DEC. 9, 1941.
2,684,902.—IMAGE TRANSFER MECHANISM FOR ELECTROSTATICALLY ADHERING IMAGES. JULY 27, 1954. CAN. 0532395.
2,781,705.—PAPER HANDLING MECHANISM FOR XEROGRAPHIC COPYING MACHINE. FEB. 19, 1957. CAN. 0547484.
2,871,819.—XEROGRAPHIC REGISTRATION GUIDE. FEB. 3, 1959.
3,062,538.—SHEET FEEDING APPARATUS. NOV. 6, 1962. CAN. 0701742.
3,071,370.—SHEET FEEDING APPARATUS. JAN. 1, 1963. CAN. 0683900, GRB. 0999435.
3,071,374.—PAPER GRIPPER MECHANISM. JAN. 1, 1963.
3,078,770.—XEROGRAPHIC REPRODUCING APPARATUS. FEB. 26, 1963. CAN. 0701741.
3,095,194.—SHEET GUIDING APPARATUS. JUNE 25, 1963. CAN. 0713451, FRA. 1355072, GER. 1174334, GRB. 1026214, ITL. 0688494, JAP. 0457839.
3,100,109.—PAPER GRIPPER MECHANISM. AUG. 6, 1963. GRB. 1015634, JAP. 0471314.
3,100,112.—DOCUMENT FEED MECHANISM. AUG. 6, 1963. GRB. 1015635, JAP. 0478676.
3,137,495.—SHEET FEED MECHANISM. JUNE 16, 1964. GRB. 1015636, JAP. 0471315.
3,179,407.—SHEET FEED GUIDE. APR. 20, 1965. CAN. 0719606, FRA. 1355071, GER. 1179562, GRB. 1023036, ITL. 0688495, JAP. 0457850.
3,190,643.—SHEET GUIDING APPARATUS. JUNE 22, 1965.
3,199,866.—SHEET FEED MECHANISM. AUG. 10, 1965. CAN. 0742591, GRB. 1043646, JAP. 0822514.
3,206,193.—XEROGRAPHIC REPRODUCING MACHINE CONTROL. SEPT. 14, 1965.
3,239,215.—DOCUMENT FEED MECHANISM. MAR. 8, 1966. CAN. 0741548, GRB. 1052820, JAP. 0497188.
3,239,220.—DOCUMENT CONVEYOR. MAR. 8, 1966. CAN. 0770495, FRA. 1434188, GRB. 1094188, ITL. 0742434.
3,245,311.—DOCUMENT CONVEYOR. APR. 12, 1966.
3,256,009.—SHEET REGISTRATION DEVICE. JUNE 14, 1966. CAN. 0777667.
3,281,144.—SHEET REGISTRATION DEVICE. OCT. 25, 1966. ARG. 0152212, AUS. 0423243, CAN. 0803888, DNK. 0122597, EIR. 0029757, GRB. 1122621, ISR. 0034133, JAP. 0512650, MEX. 0078899, NOR. 0126565, SWD. 0358034.
3,357,347.—PAPER FEEDING AND BREAKING MEANS FOR ELECTROGRAPHIC DEVICE. DEC. 12, 1967. CAN. 0863520, GRB. 1182684, JAP. 0582500.
3,374,732.—SELF-ALIGNING COPY DRUM STRIPOUT MECHANISM FOR REPRODUCTION MACH. MAR. 26, 1968.
3,375,781.—REGISTRATION MECHANISM FOR A REPRODUCTION MACHINE. APR. 2, 1968.
3,389,907.—DOCUMENT HANDLING APPARATUS. JUNE 25, 1968.
3,411,771.—SHEET TRANSPORT. NOV. 19, 1968. ARG. 0177552, ATR. 0284168, AUS. 0455833, CAN. 0869421, CHL. 0023101, CLB. 0016775, DNK. 0126100, EIR. 0031308, FIN. 0047867, GRB. 1193515, IND. 0112002, ISR. 0028520, JAP. 0604153, MEX. 0099909, NOR. 0127531, NZL. 0149790, PAK. 0119259, PLP. 0005199, PRU. 0009331, SAF. 0674988, SPN. 0344351, STZ. 0478048, SWD. 0343829, TRK. 0015345, URG. 0008858, VZL. 0026277.
3,422,756.—PAPER SUPPORT AND REGISTRATION MEANS FOR REPRODUCTION MACHINE. JAN. 21, 1969.
3,434,710.—SHEET HANDLING APPARATUS. MAR. 25, 1969. ARG. 0166613, CAN. 0830328, CHL. 0023568, CLB. 0017530, DNK. 0120163, GRB. 1206965, MEX. 0100814, PRU. 0009338, SPN. 0360895, STZ. 0502942. URG. 0008977, USR. 0433696, VZL. 0023674.
3,502,325.—CARD HANDLING APPARATUS. MAR. 24, 1970. ARG. 0168398, CAN. 0850515, CHL. 0024133, JAM. 0001890, MEX. 0105082, PRU. 0009337, URG. 0009016, VZL. 0027509.
3,509,780.—DOUBLE-ACTION ROTARY SOLENOID DRIVE MECHANISM. MAY 5, 1970.
3,517,923.—SHEET REGISTRATION APPARATUS. JUNE 30, 1970.
3,518,739.—TRACKING ROLLER. JULY 7, 1970. ARG. 0177437, AUS. 0437287, BEL. 0733662, CAN. 0884215, FRA. 6917189, GRB. 1206750, JAP. 0677424, MEX. 0111433, SPN. 0367807, SWD. 0356022, VZL. 0025065.
3,521,060.—METHOD FOR DETECTING MISROUTING OF TRANSPARENCIES DURING PROCESS OF IMAGING THEREON. JULY 21, 1970.
3,531,109.—SHEET MATERIAL TRANSPORT SYSTEM. SEPT. 29, 1970. ARG. 0177190, ATR. 0288161, AUS. 0446394, BEL. 0733197, CAN. 0899923, DNK. 0122717, FRA. 6916409, GER. 1925039, GRB. 1269100, ITL. 0863848, JAP. 0656986, MEX. 0110288, PNM. 0001431, SAF. 0693497, SPN. 0367408, SWD. 0355870.
3,536,320.—SHEET REGISTRATION DEVICE. OCT. 27, 1970.
3,556,511.—DOCUMENT FEED APPARATUS. JAN. 19, 1971. ARG. 0185791, BEL. 0741891, CAN. 0905439, FRA. 6939711, GER. 1957780, GRB. 1279129, HOL. 0144227, ITL. 0878272, MEX. 0112825.
3,556,512.—DOCUMENT FEED APPARATUS. JAN. 19, 1971. CAN. 0905438, SWD. 6915838.
3,556,513.—DOCUMENT FEED APPARATUS. JAN. 19, 1971. CAN. 0905437.
3,601,392.—SHEET REGISTERING APPARATUS. AUG. 24, 1971. ARG. 0190238, AUS. 0446147, BEL. 0752933, CAN. 0923512, CHL. 0025789, EGR. 0084327, FRA. 7024672, GRB. 1262444, ITL. 0900199, JAP. 0803410, MEX. 0115310, PNM. 0002050, SPN. 0381386, STZ. 0525780, SWD. 0356375, TIW. 0007194, USR. 0406343.
3,603,680.—ULTRASONIC PAPER DETACTION. SEPT. 7, 1971. CAN. 0915715, GRB. 1331457.
3,614,221.—IMAGING SYSTEM. OCT. 19, 1971. CAN. 0930540, GRB. 1343603, JAP. 0728865.
3,622,238.—COPIER MACHINE FEEDING MULTIPLE SIZE COPY SHEETS. NOV. 23, 1971. ARG. 0194337, AUS. 0451241, CAN. 0902127, NZL. 0160105.
3,647,207.—SHEET FEEDING MECHANISM CENTERING DEVICE. MAR. 7, 1972. CAN. 0959934, GRB. 1351765.
3,694,712.—SPEED CONTROL APPARATUS. SEPT. 26, 1972. GRB. 1339506.
3,796,486.—PROGRAMMING CONTROL SYSTEM FOR PRINTING MACHINE. MAR. 12, 1974.
3,804,516.—FIRE DETECTING DEVICE FOR A PHOTOGRAPHIC PRINTING MACHINE. APR. 16, 1974.
3,809,475.—COPIER FUSER PROTECTOR. MAY 7, 1974. FRA. 7343567.
3,815,380.—SHAFT COUPLING APPARATUS. JUNE 11, 1974.
3,819,266.—COPIER JAM PROTECTION. JUNE 25, 1974.
3,845,951.—FORAMINOUS SHEET REGISTRATION SYSTEM. NOV. 5, 1974.
3,858,777.—PRINTING APPARATUS INCLUDING REGISTRATION CONTROL. JAN. 7, 1975.
3,861,673.—BI-DIRECTIONAL SHEET TRANSPORT. JAN. 21, 1975.
3,876,317.—LATCH MECHANISM. APR. 8, 1975.
3,888,579.—DIGITAL CONTROLLED DOCUMENT FEEDER. JUNE 10, 1975.
3,893,662.—SHEET FEEDING DEVICE. JULY 8, 1975.
3,902,421.—METHOD FOR FORMING A PICTURE IMAGE. SEPT. 2, 1975.
3,934,182.—SYNCHRONIZING APPARATUS. JAN. 20, 1976. CAN. 0957735, GRB. 1372568.
3,936,042.—SHEET FEEDING DEVICES. FEB. 3, 1976.
3,947,270.—REPRODUCING APPARATUS AND PROCESS FOR DUPLEX IMAGING IN A SINGLE PASS. MAR. 30, 1976.
3,948,511.—SHEET FEEDING DEVICES. APR. 6, 1976.
3,963,339.—SHEET FEEDING APPARATUS. JUNE 15, 1976.

Class 6D 1

2,444,170.—PHOTOGRAPHIC PRINT CONVEYING MECHANISM. JUNE 29, 1948.
2,446,246.—PHOTOCOPY MACHINE. AUG. 3, 1948.
2,547,979.—PHOTOCOPY MACHINE. APR. 10, 1951.

3,148,878.—SHEET FEED MECHANISM. SEPT. 15, 1964. CAN. 0715431, GER. 1222083, GRB. 1020933, JAP. 0481251.
3,240,486.—PAPER TRANSPORT MECHANISM. MAR. 15, 1966. CAN. 0766647.
3,275,318.—SHEET CONVEYING APPARATUS. SEPT. 27, 1966. MEX. 0085657.
3,408,633.—HIGH SPEED PRINTER SYSTEM. OCT. 29, 1968.
3,482,676.—DOCUMENT FEED BELT. DEC. 9, 1969. CAN. 0890297, GRB. 1253415.
3,642,362.—APPARATUS FOR CONVEYING SHEET MATERIAL. FEB. 15, 1972. GRB. 1307117.
3,719,951.—WRAP ADJUST DEVICE FOR CONTROLLING ENGAGEMENT BETWEEN A WEB AND ROLLER IN AN IMAGING SYSTEM. MAR. 6, 1973. GRB. 1406047.
3,743,403.—TRANSPORT ASSEMBLY. JULY 3, 1973. CAN. 0983305, GRB. 1417018.
3,804,507.—PROCESSING CONTROL DEVICE FOR PRINTING MACHINES. APR. 16, 1974.
3,808,658.—SNAP ROLLER. MAY 7, 1974.
3,826,568.—SHEET TRANSPORT SYSTEM. JULY 30, 1974.
3,832,053.—BELT TRANSFER SYSTEM. AUG. 27, 1974.
3,846,020.—ELECTROSTATIC SHEET TRANSPORT SYSTEM. NOV. 5, 1974.
3,854,566.—PHOTOELECTRIC TABULATING APPARATUS. DEC. 17, 1974. BEL. 0815420, CAN. 0982969.
3,902,715.—SHEET REGISTRATION FOR PAPER HANDLING APPARATUS. SEPT. 2, 1975.
3,930,725.—MULTIPLE SHEET FEEDING SYSTEM FOR ELECTROSTATOGRAPHIC PRINTING MACHINES. JAN. 6, 1976. GRB. 1436457.

Class 6D 2

3,112,819.—CLUTCH MECHANISM—914. DEC. 3, 1963. CAN. 0688810.
3,337,015.—LATCH OPERATED AND ONE WAY COIL CLUTCHES. AUG. 22, 1967. CAN. 0810494, JAP. 0914622.
3,840,100.—UNIDIRECTIONAL COUPLING APPARATUS. OCT. 8, 1974.

Class 6D 1

3,781,004.—CONVEYING SYSTEM FOR ELECTROSTATIC PRINTING MACHINES. DEC. 25, 1973.
3,790,270.—REGISTRATION RESET SYSTEM. FEB. 5, 1974.
3,918,705.—PROCESSING CONTROL DEVICE FOR PRINTING MACHINES. NOV. 11, 1975.

Class 6E

3,348,288.—DRUM CLAMP. OCT. 24, 1967. CAN. 0838542, GRB. 1123459.
3,357,325.—XEROGRAPHIC TRANSFER APPARATUS. DEC. 12, 1967. CAN. 0812525.
3,375,782.—PROGRAMMING MECHANISM FOR A REPRODUCTION MACHINE. APR. 2, 1968.
3,567,213.—CONTROL APPARATUS FOR REGISTER STOPS AND GRIPPER FINGERS. MAR. 2, 1971.
3,685,898.—PAPER FLIP CONTROL APPARATUS. AUG. 22, 1972.
3,717,801.—METHODS AND APPARATUS FOR ELCLRSTCLY PRFMNG A TCKING OPERATION. FEB. 20, 1973.
3,826,568.—SHEET TRANSPORT SYSTEM. JULY 30, 1974.
3,841,751.—ELECTROSTATIC COLOR REPRODUCTION METHOD. OCT. 15, 1974. CAN. 0946463.
3,845,951.—FORAMINOUS SHEET REGISTRATION SYSTEM. NOV. 5, 1974.

Class 6F

3,249,354.—MULTIPLE SHEET DETECTING DEVICE. MAY 3, 1966. CAN. 0770494.
3,281,145.—PAPER REJECT MECHANISM. OCT. 25, 1966. CAN. 0770493.
3,288,462.—APPARATUS FOR HANDLING SUPERPOSED SHEETS. NOV. 29, 1966. AUS. 0422882, CAN. 0786210, EIR. 0029759, GRB. 1122625, ISR. 0034135, NOR. 0124531.
3,301,975.—SENSING DEVICE FOR DETECTING A SHEET ON A TRANSPORT OR DRUM. JAN. 31, 1967. CAN. 0800094, FRA. 1487581, GRB. 1077117, ITL. 0774188, JAP. 0923304.
3,360,652.—FAIL SAFE PHOTOELECTRIC SHEET SENSING MACHINE CONTROL CIRCUIT. DEC. 26, 1967. CAN. 0775268, FRA. 1455478, GER. 1522805, GRB. 1121099, ITL. 0732531, JAP. 0503244, MEX. 0078869.
3,396,965.—SENSOR GAUGE. AUG. 13, 1968. CAN. 0822218, GRB. 1152538, JAP. 0587326.
3,504,911.—VACUUM POWERED MULTIPLE DOCUMENT DETECTOR. APR. 7, 1970. CAN. 0861362, FRA. 1589986, GER. 1804476, GRB. 1241968, ITL. 0845395, JAP. 0656984.
3,593,065.—SHEET DETECTION APPARATUS. JULY 13, 1971. CAN. 0923544, CZC. 0151559, GRB. 1322794, USR. 0365085.
3,614,419.—MULTIPLE SHEET DETECTION SYSTEM. OCT. 19, 1971. ARG. 0186441, BEL. 0765366, CAN. 0930052, FRA. 7113404, GRB. 1342656, ITL. 0922694, MEX. 0119754, VZL. 0021933.
3,627,311.—SHEET SENSOR. DEC. 14, 1971. CAN. 0871371, GRB. 1322258.
3,628,785.—GRIP FORCE DETECTION APPARATUS. DEC. 21, 1971. ARG. 0185946, AUS. 0455882, BEL. 0760750, CAN. 0923158, FRA. 7047695, GRB. 1340206, ITL. 0913997, MEX. 0117505, STZ. 0518227, SWD. 7017384, VZL. 0032788.
3,650,616.—MISPUFF DETECTOR. MAR. 21, 1972. BEL. 0778739, CAN. 0954181, FRA. 7203548, GRB. 1374923, ITL. 0947120.
3,650,617.—SWITCHING DETECTOR—A. MAR. 21, 1972.
3,650,618.—SWITCHING DETECTOR—B. MAR. 21, 1972.
3,650,619.—SWITCHING DETECTOR—C. MAR. 21, 1972.
3,684,890.—PHOTOSENSITIVE MISFEED DETECTOR. AUG. 15, 1972. CAN. 0929631, GRB. 1335444.
3,778,051.—SUPERPOSED SHEET DETECTOR. DEC. 11, 1973. CAN. 0975067.
3,791,729.—APPARATUS FOR MONITORING A SHEET TRANSPORT MECHANISM. FEB. 12, 1974. CAN. 0991244, GRB. 1413069.
3,882,308.—DETECTION SYSTEM FOR SUPERPOSED SHEETS. MAY 6, 1975. CAN. 0929632, GRB. 1342838.
3,932,755.—DEVICE FOR DETECTING DOUBLE SHEET FEEDING. JAN. 13, 1976.

Class 6G

3,152,757.—XEROGRAPHIC CONTROL APPARATUS. OCT. 13, 1964.
3,260,455.—STEPPED COUNTING APPARATUS. JULY 12, 1966. ARG. 0157223, BRA. 0083779, CAN. 0760825, FRA. 1459930, GRB. 1113420, ITL. 0729650, MEX. 0094217.
3,301,126.—REPRODUCING APPARATUS. JAN. 31, 1967. CAN. 0777413, EIR. 0029760, GRB. 1122626, ISR. 0034136, JAP. 0669365, NOR. 0128732.
3,358,570.—COPY COUNTING SYSTEM. DEC. 19, 1967. CAN. 0842444, FRA. 1508192, GER. 1283855, GRB. 1165943, ITL. 0787991, JAP. 0572187.
3,375,780.—SHEET COUNTING MECHANISM FOR REPRODUCTION MACHINES. APR. 2, 1968.
3,375,783.—COPY INDICATING MECHANISM FOR A REPRODUCTION MACHINE. APR. 2, 1968.
3,588,472.—LOGIC CONTROL APPARATUS. JUNE 28, 1971. ARG. 0181590, ATR. 0279353, BEL. 0706629, BRA. 6793350, CAN. 0834957, FRA. 1567082, GRB. 1204719, ITL. 0815466, JAP. 0645591, LXB. 0054882, MEX. 0101675, VZL. 0023684.
3,655,281.—BILLING APPARATUS. APR. 11, 1972. BEL. 0760911, CAN. 0929013, FRA. 7047633, GRB. 1329579, ITL. 0913956, JAP. 0766713.
3,813,157.—CONTROL LOGIC FOR TROUBLE DETECTION AND RECOVERY. MAY 28, 1974.
3,831,933.—TAMPER DETECTION AND RECOVERY. AUG. 27, 1974.
3,916,171.—COUNTING CIRCUIT. OCT. 28, 1975.

Class 6H

3,062,536.—SHEET STRIPPING APPARATUS. NOV. 6, 1962. ARG. 0174781, CAN. 0736834, PNM. 0001999, VZL. 0023703.
3,090,616.—SHEET HANDLING CONTROL APPARATUS. MAY 21, 1963. CAN. 0683777.
3,339,069.—CORONA CHARGING DEVICE W/MEANS TO PREVENT TONER DUST CONTAMINATION. AUG. 29, 1967. CAN. 0788539, FRA. 1450010, GRB. 1116687, ITL. 0730715, JAP. 0875339, MEX. 0089459.
3,357,400.—ELECTROSTATIC APPARATUS FOR PAPER DETACKING. DEC. 12, 1967. CAN. 0841229, MEX. 0100315.
3,450,402.—SHEET STRIPPER APPARATUS. JUNE 17, 1969.
3,506,259.—ELECTROSTATIC SHEET DETACKING APPARATUS. APR. 14, 1970. ARG. 0177881, AUS. 0418161, BEL. 0721966, CAN. 0848612, FRA. 1585343, GRB. 1230113, ITL. 0895052, MEX. 0104231.

3,578,859.—MECHANICAL STRIPPING APPARATUS. MAY 18, 1971. ARG. 0185526, AUS. 0445289, BEL. 0752938, CAN. 0922771, CHL. 0025913, EGR. 0085002, FRA. 7024669, GRB. 1296763, GUA. 0002611, ITL. 0900197, MEX. 0117139, PNM. 0002049, SPN. 0381384, STZ. 0523150, SWD. 0366849, TIW. 0007785, USR. 0443525, VZL. 0032781.

3,620,615.—SHEET STRIPPING APPARATUS. NOV. 16, 1971. CAN. 0927472, GRB. 1290518.

3,704,881.—TRANSFER SHEET PEELING DEVICE FOR XEROGRAPHIC APPARATUS. DEC. 5, 1972.

3,774,907.—VACUUM SHEET STRIPPING APPARATUS. NOV. 27, 1973. CAN. 0966519.

3,804,401.—PNEUMATIC STRIPPING APPARATUS. APR. 16, 1974.

3,811,670.—ELECTROSTATOGRAPHIC APPARATUS WITH AIR BAFFLE. MAY 21, 1974.

3,819,175.—VACUUM STRIPPING ROLL WITH STATIONARY PICKUP SLOTS. JUNE 25, 1974.

3,820,778.—VACUUM STRIPPING ROLL WITH ROTARY PICKUP SLOTS. JUNE 28, 1974.

3,826,568.—SHEET TRANSPORT SYSTEM. JULY 30, 1974.

3,837,640.—STRIPPER FINGER WITH AIR CUSHION. SEPT. 24, 1974. FRA. 7338663, GRB. 1427058, ITL. 998964.

3,857,560.—ADHESIVE PAPER PICK-OFF SYSTEM. DEC. 31, 1974.

3,885,785.—VACUUM TRANSPORT. MAY 27, 1975.

3,885,786.—STRIPPER FINGER. MAY 27, 1975. GRB. 1402956.

3,891,206.—SHEET STRIPPING APPARATUS. JUNE 24, 1975.

3,895,793.—VACUUM SHEET STRIPPER. JULY 22, 1975.

3,907,280.—FLEXIBLE SHEET HANDING DEVICE. SEPT. 23, 1975. FRA. 7322885.

3,940,126.—SHEET HANDLING MECHANISM. FEB. 24, 1976.

3,948,507.—COPYING STRIPPER. APR. 6, 1976.

3,970,381.—METHOD AND APPARATUS FOR XEROGRAPHIC REPRODUCTION. JULY 20, 1976. BEL. 0811188.

Class 6I

RE.27,720.—SIGNAL STORAGE DEVICE - RE OF 3,416,861-D1593. AUG. 7, 1973.

1,976,156.—PAPER CUTTING MACHINE. OCT. 9, 1934.

2,043,004.—PHOTOCOPY MACHINE. JUNE 2, 1936.

2,047,478.—PAPER FEEDING AND CUTTING MECHANISM. JULY 14, 1936.

2,216,629.—SLITTING AND CUTOFF MECHANISM FOR SHEET MATERIAL. OCT. 1, 1940.

3,075,493.—XEROGRAPHIC APPARATUS WITH WEB CUTTING MEANS. JAN. 29, 1963. CAN. 0682231, FRA. 1280975, GER. 1177487, GRB. 0979161, JAP. 0502929.

3,105,425.—WEB MARKING AND CUTTING APPARATUS FOR XEROGRAPHIC REPRODUCING DEVICES. OCT. 1, 1963. CAN. 0701949.

3,135,179.—XEROGRAPHIC APPARATUS. JUNE 2, 1964.

3,135,180.—XEROGRAPHIC APPARATUS. JUNE 2, 1964.

3,244,084.—WEB MARKING DEVICE FOR XEROGRAPHIC REPRODUCING APPARATUS. APR. 5, 1966.

3,401,613.—WEB CUTTER CONTROL DEVICE FOR XEROGRAPHIC REPRODUCING APPARATUS. SEPT. 17, 1968. CAN. 0786141, GRB. 1118217, JAP. 0517506.

3,402,628.—CUTTING APPARATUS. SEPT. 24, 1968. CAN. 0847666, GRB. 1137800.

3,418,046.—SIGNAL STORAGE DEVICE. DEC. 24, 1968. CAN. 0852814, GER. 1524999, GRB. 1190084, JAP. 0589515.

3,466,959.—WEB MATERIAL HANDLING APPARATUS. SEPT. 16, 1969.

3,485,622.—PRINTING OF TIMING MARKS IN XEROGRAPHIC PROCESS. DEC. 23, 1969. FRA. 1488142, GER. 1047451, JAP. 0608701.

3,504,586.—ROLL CONVERTER CONTROL. APR. 7, 1970.

3,506,175.—ROLL STOCK CONVERTING APPARATUS. APR. 14, 1970.

3,585,289.—FACSIMILE RECORDING APPARATUS WITH CAM OPERATED PAPER CUTTER. JUNE 15, 1971.

3,591,279.—CUT AND DEFLECT WEB DRIVE APPARATUS. JULY 6, 1971. CAN. 0924635, FRA. 7019910, GRB. 1307549, ITL. 0893691.

3,639,053.—WEB CUTTING AND FEEDING APPARATUS. FEB. 1, 1972. ARG. 0192554, AUS. 0461657, BEL. 0749786, CAN. 0917974, FRA. 7015812, GRB. 1314727, ITL. 0900026, MEX. 0116866, SAF. 0703019, SPN. 0379248, STZ. 0516181, SWD. 7006081.

3,728,920.—CUT AND DEFLECT WEB DRIVE APPARATUS. APR. 24, 1973.

3,743,409.—CUTTER ASSEMBLY. JULY 3, 1973. BEL. 0784635, CAN. 0974447, FRA. 7220418, GRB. 1400465, ITL. 0956414.

3,855,890.—SLITTER/PERFORATOR APPARATUS. DEC. 24, 1974. BEL. 808873, FRA. 7345296, GRB. 1423770.

3,882,744.—ELECTROSTATOGRAPHIC WEB FEEDING APPARATUS. MAY 13, 1975.

3,931,090.—RUBBER COMPOSITIONS FOR FLEXIBLE BELTS. JAN. 6, 1976.

Class 6J

3,380,733.—SHEET STRIPPING APPARATUS. APR. 30, 1968. ATR. 0268045, AUS. 0413138, BEL. 0689067, CAN. 0819593, DNK. 0112289, FRA. 1499560, GER. 1522704, GRB. 1157342, ITL. 0788572, JAP. 0560087, LXB. 0052213, MEX. 0101989, NOR. 0122220, NZL. 0146848, PTG. 0046633, SAF. 0666572, SPN. 0332819, STZ. 0468661, SWD. 0326103, USR. 0261292.

3,416,791.—DOCUMENT INVERTING APPARATUS. DEC. 17, 1968. CAN. 0853562, GRB. 1210564, JAP. 0648074.

3,548,783.—PAPER TRANSPORT - SHEET TURNER - PAPER TRANSPORT-90 DEG TURN. DEC. 22, 1970.

3,627,312.—RESTACKING APPARATUS. DEC. 14, 1971. AUS. 0447183, BEL. 0752942, CAN. 0922747, CHL. 0025830, EGR. 0084128, FRA. 7024663, GRB. 1312303, GUA. 0002616, ITL. 0900193, JAP. 791920, MEX. 0114980, PNM. 0001953, SPN. 0381379, STZ. 0525779, SWD. 0359381, TIW. 0022313, VZL. 0032782.

3,856,295.—INVERTER-REVERSER FOR A REPRODUCTION MACHINE. DEC. 24, 1974.

3,862,802.—SHEET REVERSING APPARATUS AND A DUPLEX REPRODUCING APPARATUS EMPLOYING SAME. JAN. 28, 1975. BEL. 0818894.

3,942,785.—SELF-ACTUATING SHEET INVERTER-REVERSER. MAR. 9, 1976.

3,944,212.—SHEET REVERSING MECHANISM. MAR. 16, 1976.

3,947,270.—REPRODUCING APPARATUS AND PROCESS FOR DUPLEX IMAGING IN A SINGLE PASS. MAR. 30, 1976.

Class 6K

D.227,933.—SORTER. JULY 24, 1973.

D.233,937.—SORTER. DEC. 17, 1974.

D.236,030.—PAPER TRAY. JULY 22, 1975.

3,395,913.—SHEET MATERIAL DISTRIBUTION SYSTEM. AUG. 6, 1968. AUS. 0409539, BEL. 0704922, CAN. 0832159, FRA. 1543565, GRB. 1193517, ITL. 0823413, JAP. 0645590, MEX. 0101165, USR. 0343419.

3,460,824.—MODULAR SHEET DISTRIBUTOR. AUG. 12, 1969. ARG. 0175858, ATR. 0304588, AUS. 0443802, CAN. 0871013, CHL. 0023362, CLB. 0016672, EIR. 0031307, FIN. 0047868, GRB. 1193514, IND. 0112001, ISR. 0028521, JAP. 0645589, MEX. 0099178, NOR. 0125174, NZL. 0149789, PAK. 0119258, PLP. 0006159, PRU. 0009362, SAF. 0674987, SPN. 0344350, STZ. 0478049, SWD. 0342203, TRK. 0014721, URG. 0008514, VZL. 0016672.

3,484,101.—SORTING APPARATUS FOR DOCUMENTS. DEC. 16, 1969. CAN. 0889441, GRB. 1246033.

3,552,739.—SHEET HANDLING APPARATUS. JAN. 5, 1971. BEL. 0738575, CAN. 0921945, FRA. 6930567, GRB. 1274277, ITL. 0871023.

3,565,420.—DOCUMENT FEEDING APPARATUS. FEB. 23, 1971. ARG. 0184075, AUS. 0453309, BEL. 0750391, CAN. 0922328, EGR. 0082941, FRA. 7017112, GRB. 1305825, ITL. 0893198, MEX. 0117914, SPN. 0379694, STZ. 0513435, SWD. 0368797, USR. 0476767.

3,589,808.—REPRODUCING APPARATUS. JUNE 29, 1971. CAN. 0917482.

3,618,936.—JAM DETECTION SYSTEM FOR SORTING APPARATUS. NOV. 9, 1971. AUS. 0445492, BEL. 0758059, CAN. 0949671, EGR. 0088009, FRA. 7041622, GRB. 1324119, ITL. 0909902, SPN. 0385034, STZ. 0525723, TIW. 0007648.

3,622,061.—STAPLE FEED AND FASTENING APPARATUS. NOV. 23, 1971.

3,630,607.—SET SEPARATION COPIER SYSTEM. DEC. 28, 1971.

3,649,006.—SHEET HANDLING APPARATUS. MAR. 14, 1972. BEL. 0762643, CAN. 0944310, FRA. 7104922, GRB. 1341286, ITL. 0918344, JAP. 0795150.

3,652,875.—CONTROL CIRCUIT FOR DRIVING STAPLING MECHANISM. MAR. 28, 1972.

3,669,447.—SHEET PROPELLING APPARATUS. JUNE 13, 1972. CAN. 0938624.

3,671,094.—COVER APPARATUS. JUNE 20, 1972.

3,682,328.—TRAY APPARATUS. AUG. 8, 1972.

3,685,712.—STAPLING APPARATUS. AUG. 22, 1972. CAN. 0953851.
3,695,756.—SHEET STRIPPING APPARATUS. OCT. 3, 1972. BEL. 0774563, CAN. 0950931, FRA. 7139637, GRB. 1366909, ITL. 0937673.
3,707,418.—METHOD OF BINDING. DEC. 26, 1972. CAN. 0974723, EGR. 0094346, GRB. 1359338.
3,709,485.—CONTROL CIRCUIT FOR SORTING SYSTEM. JAN. 9, 1973.
3,709,492.—SORTING APPARATUS. JAN. 9, 1973. ARG. 0194366, AUS. 0457968, BEL. 0783854, CAN. 0000000, FRA. 7218317, GRB. 1365399, ITL. 0955692, MEX. 0127721, SPN. 0403108, STZ. 0555198.
3,719,266.—SHEET STACKING APPARATUS. MAR. 6, 1973.
3,735,978.—METHOD AND APPARATUS FOR STACKING COPY SHEETS. MAY 29, 1973. ARG. 0190825, BEL. 0772406, CAN. 0951340, FRA. 7133309, GRB. 1358420, ITL. 0936377, MEX. 0125745.
3,788,640.—MOVING BIN SORTING APPARATUS. JAN. 29, 1974. FRA. 7346312, GRB. 1429726.
3,793,016.—ELECTROPHOTOGRAPHIC SHEET BINDING PROCESS. FEB. 19, 1974.
3,794,550.—SHEET BINDING. FEB. 26, 1974.
3,833,911.—REPRODUCTION SYSTEM AND METHOD WITH SIMPLEX AND DUPLEX MODES OF OPERATION. SEPT. 3, 1974.
3,841,754.—DUPLEX REPRODUCTION SYSTEM. OCT. 15, 1974.
3,841,827.—DUPLEX REPRODUCTION SYSTEM. OCT. 15, 1974. BEL. 0816155.
3,845,949.—SORTER CONTROL TO PREVENT OVERSTACKING IN THE SORTER TRAYS. NOV. 5, 1974. BEL. 808173, GRB. 1436599.
3,848,995.—COPIER/DUPLICATOR SYSTEM. NOV. 19, 1974. BEL. 0815548.
3,861,219.—METHOD FOR MEASURING HEAT AND PRESSURE CHARACTERISTICS OF FUSING APP. JAN. 21, 1975.
3,861,861.—FUSER ROLL CLEANING APPARATUS. JAN. 21, 1975.
3,866,904.—MULTIPLE FEED SORTING APPARATUS. FEB. 18, 1975.
3,868,019.—TRAY APPARATUS. FEB. 25, 1975. FRA. 7346312, GRB. 1429726.
3,870,295.—SORTER SUPPLEMENT CONTROL. MAR. 11, 1975.
3,871,643.—SORTER CONTROL. MAR. 18, 1975. BEL. 808172, GRB. 1422029.
3,878,818.—CLEANING APPARATUS FOR DRY FUSER ROLLS. APR. 22, 1975.
3,880,119.—DEVELOPMENT APPARATUS. APR. 29, 1975.
3,902,709.—BINLESS SORTER. SEPT. 2, 1975.
3,907,276.—WOBBLE JOGGER. SEPT. 23, 1975.
3,908,978.—BINLESS SORTING APPARATUS. SEPT. 30, 1975. GRB. 1426020.
3,917,256.—DUAL PURPOSE SHEET HANDLING APPARATUS. NOV. 4, 1975.
3,917,257.—SHEET INVERTER APPARATUS. NOV. 4, 1975. FRA. 7346309.
3,938,802.—SHEET STACKING APPARATUS. FEB. 17, 1976.
3,941,369.—SHEET DISTRIBUTING APPARATUS. MAR. 2, 1976.
3,947,018.—UNIVERSAL FEEDER-STACKER. MAR. 30, 1976. BEL. 0836262.
3,948,508.—SHEET DETECTING APPARATUS. APR. 6, 1976.
3,971,554.—SHEET STACKER. JULY 27, 1976.
3,973,769.—COMPACT SORTING APPARATUS. AUG. 10, 1976. BEL. 0836261.

Class 7

3,784,300.—PRE-TRANSFER STATION. JAN. 8, 1974. AUS. 0465154, BEL. 0789340, EGR. 0106095, FRA. 7234200, GRB. 1379826, ITL. 0972691, MEX. 0128584, SPN. 0409975, STZ. 0557051, SWD. 7215168.
3,809,471.—PHOTOELECTROPHORETIC IMAGING APPARATUS WITH CORRECTION FOR PARALLAX. MAY 7, 1974.
3,819,263.—CLEANING APPARATUS. JUNE 25, 1974. ARG. 0200252, BEL. 0796984, EGR. 0104374, GRB. 1421929, ISR. 0041829, ITL. 0983618, MEX. 131438, SAF. 0732067, STZ. 0556047.

Class 7A

3,850,517.—HIGH SPEED PRINTOUT SYSTEM. NOV. 26, 1974.

Class 7A 1

3,051,041.—IMAGE PROJECTION. AUG. 28, 1962. CAN. 0734194, GRB. 0956359.
3,083,623.—TRANSFERRED IMAGE APPARATUS. APR. 2, 1963. CAN. 0701631.
3,148,581.—CYLINDRICAL SURFACE PROJECTION APPARATUS. SEPT. 15, 1964.
3,273,999.—IMAGE DEFORMATION UTILIZING A PRISM. SEPT. 20, 1966. CAN. 0840628, FRA. 1367772, GRB. 1034097, ITL. 0699466, SAF. 0002971, SWD. 0306232.
3,320,061.—MASKING BY TOTAL INTERNAL REFLECTION FOR IMAGE REPRODUCTION AND DISPLAY. MAY 16, 1967. CAN. 0847533, FRA. 1401615, GER. 1497081, GRB. 1065986, ITL. 0729029, JAP. 0471308.
3,481,668.—IMAGE PROJECTION APPARATUS. DEC. 2, 1969.
3,510,660.—METHOD FOR VISUAL COMPARISON OF INFORMATION. MAY 5, 1970. CAN. 0848611, GRB. 1201376, JAP. 0595641.
3,519,344.—IMAGE PROJECTION. JULY 7, 1970.
3,622,217.—LIGHT PRODUCING SYSTEM. NOV. 23, 1971.

Class 7A 2

3,196,765.—IMAGE DEVELOPMENT AND PROJECTION. JULY 27, 1965.
3,355,308.—PROJECTION TRANSPARENCY HAVING A TRANSPARENT POWDER IMGE. NOV. 28, 1967.
3,607,256.—FULLY-ENCLOSED ELECTROPHORETIC IMAGING SYSTEM. SEPT. 21, 1971.

Class 7B

3,501,294.—METH OF TREATNG SURFACE OF XIC PLATE W/METAL SALT OF A FATTY ACID TO IMPROVE IMAGE TRANSFER. MAR. 17, 1970. ARG. 0168294, AUS. 0419434, BEL. 0706369, CAN. 0880230, CHL. 0027764, FRA. 1544449, GRB. 1209644, ITL. 0822799, MEX. 0102265, PNM. 0002797, SWD. 0340047, VZL. 0023670.
3,690,754.—CONTROL SYSTEM FOR AN OPTICAL IMAGING SYSTEM. SEPT. 12, 1972. CAN. 0949797, GRB. 1337420.
3,884,825.—IMAGING COMPOSITION. MAY 20, 1975. AUS. 0467835, BEL. 0802879, GRB. 1437041.
3,973,843.—ELECTROSTATOGRAPHIC IMAGING APPARATUS. AUG. 10, 1976. AUS. 0467835, BEL. 0802879, GRB. 1437041.

Class 7C

2,576,047.—METHOD AND APPARATUS FOR PRINTING ELECTRICALLY. NOV. 20, 1951. AUS. 0150449, CAN. 0485073, GER. 0919891, GRB. 0675398, STZ. 0286141, SWD. 0163889.
2,681,473.—MANUFACTURE OF PLAQUES AND THE LIKE. JUNE 22, 1954.
2,684,901.—IMAGE TRANSFER DEVICE. JULY 27, 1954.
2,847,305.—XEROGRAPHIC TRANSFER PROCESS. AUG. 12, 1958.
2,919,191.—XEROGRAPHIC TRANSFER METHOD. DEC. 29, 1959.
2,951,443.—IMAGE REPRODUCTION. SEPT. 6, 1960. AUS. 0243878, FRA. 1247806, GRB. 0887232, ITL. 0622716, JAP. 0320090.
3,063,859.—METHOD AND APPARATUS FOR TRANSFERRING IMAGES FROM XEROGRAPHIC TO METALLIC PLATES. NOV. 13, 1962.
3,071,070.—METHOD AND APPARATUS FOR TRANSFERRING IMAGES FROM XEROGRAPHIC TO METALLIC PLATES. JAN. 1, 1963. CAN. 0638821.
3,620,616.—TRANSFER DRUM WITHDRAWAL APPARATUS. NOV. 16, 1971. BEL. 0751487, CAN. 0923543, FRA. 7020458, GRB. 1300267, ITL. 0893835.
3,633,543.—BIASED ELECTRODE TRANSFER APPARATUS. JAN. 11, 1972. CAN. 0914398, GRB. 1337123, JAP. 783769.
3,781,105.—CONSTANT CURRENT BIASING TRANSFER SYSTEM. DEC. 25, 1973.
3,795,441.—TRANSFER ROLLER. MAR. 5, 1974.
3,822,093.—TRANSFER REGULATING APPARATUS. JULY 2, 1974.
3,830,589.—CONDUCTIVE BLOCK TRANSFER SYSTEM. AUG. 20, 1974.
3,832,053.—BELT TRANSFER SYSTEM. AUG. 27, 1974.
3,832,055.—FORAMINOUS VACUUM BIAS ROLL TRANSFER SYSTEM. AUG. 27, 1974.
3,837,741.—CONTROL ARRANGEMENT FOR TRANSFER ROLL POWER SUPPLY. SEPT. 24, 1974.

3,837,883.—IMAGE TRANSFER PROCESS. SEPT. 24, 1974. ARG. 0203811, AUS. 0461437, BEL. 0760456, CAN. 0947368, FRA. 7047140, GRB. 1339577, ITL. 0913634, MEX. 0119591, SWD. 7017139.

3,842,800.—TRANSFER ROLLER ASSEMBLY. OCT. 22, 1974. BEL. 0793553, CAN. 9780221, FRA. 7237770, GRB. 1412454, ITL. 0000000, SWD. 7216978.

3,846,020.—ELECTROSTATIC SHEET TRANSPORT SYSTEM. NOV. 5, 1974.

3,847,119.—TRANSFER ROLLER ASSEMBLY. NOV. 12, 1974. ARG. 0196224, ATR. 327002, AUS. 0464751, BEL. 0796983, EGR. 0103979, GER. 0103979, GRB. 1413711, ITL. 0983617, MEX. 131018, SAF. 0722068, SPN. 0413018, STZ. 0558033, SWD. 7304021.

3,847,478.—SEGMENTED BIAS ROLL. NOV. 12, 1974.

3,848,204.—PRESSURE ADJUSTABLE ELECTROPHOTOGRAPHIC PRINTING MACHINE TRANSFER APPARATUS. NOV. 12, 1974.

3,860,436.—CONSTANT CURRENT BIASING TRANSFER SYSTEM. JAN. 14, 1975.

3,866,572.—FORAMINOUS ELECTROSTATOGRAPHIC TRANSFER SYSTEM. FEB. 18, 1975. BEL. 0815546.

3,877,416.—HUMIDITY CORRECTED TRANSFER APPARATUS. APR. 15, 1975. BEL. 0814054, STZ. 0573612.

3,888,208.—IMAGE TRANSFER PROCESS. JUNE 10, 1975.

3,901,186.—TRANSFER ROLLER ASSEMBLY. AUG. 26, 1975. BEL. 0816848.

3,924,943.—SEGEMENTED BIASED TRANSFER MEMBER. DEC. 9, 1975.

3,936,175.—INTERNALLY SHIELDED TRANSFER ROLLER. FEB. 3, 1976.

3,942,888.—STEPPED TRANSFER ROLLER. MAR. 9, 1976.

3,959,574.—BIASABLE MEMBER AND METHOD FOR MAKING. MAY 25, 1976.

Class 7C 1

2,626,865.—PORTABLE ELECTROPHOTOGRAPHIC POWDER-IMAGE TRANSFER MECHANISM. JAN. 27, 1953.

2,684,902.—IMAGE TRANSFER MECHANISM FOR ELECTROSTATICALLY ADHERING IMAGES. JULY 27, 1954. CAN. 0532395.

2,807,232.—XEROGRAPHIC POWDER-IMAGE TRANSFER SQUEEGEE. SEPT. 24, 1957.

2,812,709.—MULTIPLE COPY TRANSFER PROCESS AND APPARATUS. NOV. 12, 1957. CAN. 0603435.

2,995,108.—XEROGRAPHIC POWDER IMAGE TRANSFER APPARATUS. AUG. 8, 1961.

3,150,003.—APPARATUS FOR TRANSFERRING XEROGRAPHIC IMAGES. SEPT. 22, 1964.

3,150,004.—XEROGRAPHIC TRANSFER APPARATUS. SEPT. 22, 1964.

3,244,083.—XEROGRAPHIC DEVICE. APR. 5, 1966. AUS. 0284069, CAN. 0710975, FRA. 1379820, GRB. 1030449, JAP. 0654006.

3,339,069.—CORONA CHARGING DEVICE W/MEANS TO PREVENT TONER DUST CONTAMINATION. AUG. 29, 1967. CAN. 0788539, FRA. 1450010, GRB. 1116687, ITL. 0730715, JAP. 0875339, MEX. 0089459.

3,357,325.—XEROGRAPHIC TRANSFER APPARATUS. DEC. 12, 1967. CAN. 0812525.

3,444,369.—METHOD AND APPARATUS FOR SELECTIVE CORONA TREATMENT OF TONER PARTICLES. MAY 13, 1969. ARG. 0167581, ATR. 0288863, AUS. 0415969, BEL. 0704919, BRA. 6791610, CAN. 0845871, DNK. 0119094, FRA. 1540696, GRB. 1203811, ITL. 0853627, JAP. 0587935, MEX. 0099470, SPN. 0345918, STZ. 0487438, SWD. 0337986, VZL. 0023669.

3,765,330.—XEROPRINTING EMPLOYING LETTER PRESS SURFACE COVERED WITH A LAYER OF RESISTIVE MATERIAL. OCT. 16, 1973. CAN. 0949806, GRB. 1374651.

3,850,519.—XEROGRAPHIC IMAGE TRANSFER APPARATUS. NOV. 26, 1974. ARG. 0202116, BEL. 0809579, STZ. 0567748.

3,870,515.—METHOD FOR ELECTROSTATIC PAPER STRIPPING BY NEUTRALIZATION OF TRANSFER CHARGE. MAR. 11, 1975.

3,877,417.—TRANSFER CORONA GENERATING DEVICE WITH SUPPORT BRUSHES. APR. 15, 1975.

3,918,403.—CORONA TRANSFER MECHANISM. NOV. 11, 1975.

3,920,325.—MOISTURE STABLE BIAS TRANSFER ROLL. NOV. 18, 1975.

3,966,199.—BELT TRANSFER LOADING SYSTEM. JUNE 29, 1976.

Class 7C 1A

2,892,708.—XEROGRAPHIC TRANSFER PROCESS. JUNE 30, 1959.

3,004,860.—INDUCTION POWDER TRANSFER. OCT. 17, 1961. AUS. 0222781, CAN. 0647848, FRA. 1205569, GER. 1131707, GRB. 0886730, ITL. 0599628, JAP. 0318804.

3,319,604.—XEROGRAPHIC TRANSFER APPARATUS. MAY 16, 1967.

Class 7C 2

3,132,037.—XEROGRAPHIC TRANSFER METHOD. MAY 5, 1964. CAN. 0727919.

3,132,050.—XEROGRAPHIC TRANSFER APPARATUS. MAY 5, 1964.

3,795,441.—TRANSFER ROLLER. MAR. 5, 1974.

3,817,616.—THERMAL CHAMBER FOR DEVELOPABILITY REGULATING APPARATUS. JUNE 18, 1974. CAN. 0991247.

3,838,918.—TRANSFER APPARATUS. OCT. 1, 1974. BEL. 0811434.

3,892,962.—THERMAL CHAMBER FOR A DEVELOPABILITY REGULATING APPARATUS. JULY 1, 1975. CAN. 0991247.

Class 7C 3

2,812,709.—MULTIPLE COPY TRANSFER PROCESS AND APPARATUS. NOV. 12, 1957. CAN. 0603435.

2,951,443.—IMAGE REPRODUCTION. SEPT. 6, 1960. AUS. 0243878, FRA. 1247806, GRB. 0887232, ITL. 0622716, JAP. 0320090.

3,004,860.—INDUCTION POWDER TRANSFER. OCT. 17, 1961. AUS. 0222781, CAN. 0647848, FRA. 1205569, GER. 1131707, GRB. 0886730, ITL. 0599628, JAP. 0318804.

3,244,083.—XEROGRAPHIC DEVICE. APR. 5, 1966. AUS. 0284069, CAN. 0710975, FRA. 1379820, GRB. 1030449, JAP. 0654006.

3,612,677.—ELECTROSTATIC TRANSFER APPARATUS. OCT. 12, 1971. CAN. 0941220, GRB. 1296742.

3,697,170.—AUTOMATIC DUPLEXING APPARATUS. OCT. 10, 1972. CAN. 0948269.

3,697,171.—SIMULTANEOUS IMAGE TRANSFER. OCT. 10, 1972. ARG. 0192330, AUS. 0461728, BEL. 0777016, CAN. 0948267, FRA. 7146256, GRB. 1368456, ITL. 0944212, MEX. 0124562, SWD. 0366123, VZL. 32765.

3,702,482.—BIAS ROLL TRANSFER. NOV. 7, 1972. ARG. 0191238, BEL. 0777017, CAN. 0962890, FRA. 7146257, GRB. 1368500, ITL. 0944209, MEX. 0126775.

3,734,015.—SINGLE PASS DUPLEXING BY SEQUENTIAL TRANSFER. MAY 22, 1973. ARG. 0192332, BEL. 7777018, CAN. 0948691, FRA. 7146258, GRB. 1368496, ITL. 0944211, MEX. 0124992.

3,902,801.—COLOR CORRECTED PRINTING SYSTEM. SEPT. 2, 1975.

Class 7C 4

2,812,709.—MULTIPLE COPY TRANSFER PROCESS AND APPARATUS. NOV. 12, 1957. CAN. 0603435.

3,004,860.—INDUCTION POWDER TRANSFER. OCT. 17, 1961. AUS. 0222781, CAN. 0647848, FRA. 1205569, GER. 1131707, GRB. 0886730, ITL. 0599628, JAP. 0318804.

3,444,369.—METHOD AND APPARATUS FOR SELECTIVE CORONA TREATMENT OF TONER PARTICLES. MAY 13, 1969. ARG. 0167581, ATR. 0288863, AUS. 0415969, BEL. 0704919, BRA. 6791610, CAN. 0845871, DNK. 0119094, FRA. 1540696, GRB. 1203811, ITL. 0853627, JAP. 0587935, MEX. 0099470, SPN. 0345918, STZ. 0487438, SWD. 0337986, VZL. 0023669.

3,640,249.—TRANSFER APPARATUS. FEB. 8, 1972. BEL. 0758058.

3,647,292.—TRANSFER APPARATUS. MAR. 7, 1972. AUS. 0450919, BEL. 0759452, CAN. 0919004, FGR. 0086978, FRA. 7043065, GRB. 1319148, ITL. 0909441, JAP. 0773213, SPN. 0385845, STZ. 0519187, SWD. 7015876.

3,650,617.—SWITCHING DETECTOR-A. MAR. 21, 1972.

3,650,618.—SWITCHING DETECTOR-B. MAR. 21, 1972.

3,687,545.—SHORT FOCAL LENTH OPTICAL IMAGING SYSTEM. AUG. 29, 1972. BEL. 0747977, CAN. 0913438, FRA. 7011547, GRB. 1300156, ITL. 0898935, JAP. 0731226.

3,729,311.—ELECTROSTATIC TRANSFER METHOD. APR. 24, 1973.

3,854,974.—METHOD FOR TRANSFERRING A TONER IMAGE. DEC. 17, 1974.

3,926,824.—ELECTROSTATOGRAPHIC DEVELOPER COMPOSITION. DEC. 16, 1975. ARG. 0192480, AUS. 0466319, BEL. 0793098, CAN. 0985552, FRA. 7245403, GRB. 1417179, ITL. 0973327, STZ. 0028663.
3,932,035.—APPARATUS FOR TRANSFERRING A TONER IMAGE. JAN. 13, 1976.

Class 7C 8

3,957,367.—A COLOR ELECTROSTATOGRAPHIC PRINTING MACHINE. MAY 18, 1976.

Class 7D

3,093,039.—APPARATUS FOR TRANSFERRING POWDER IMAGES AND METHOD THEREFOR. JUNE 11, 1963. CAN. 0744873.

Class 7E

3,013,526.—XEROGRAPHIC IMAGE TRANSFER APPARATUS. DEC. 19, 1961.
3,063,351.—XEROGRAPHIC POWDER IMAGE TRANSFER APPARATUS. NOV. 13, 1962. CAN. 0706541.
3,132,050.—XEROGRAPHIC TRANSFER APPARATUS. MAY 5, 1964.
3,375,781.—REGISTRATION MECHANISM FOR A REPRODUCTION MACHINE. APR. 2, 1968.
3,375,782.—PROGRAMMING MECHANISM FOR A REPRODUCTION MACHINE. APR. 2, 1968.
3,422,756.—PAPER SUPPORT AND REGISTRATION MEANS FOR REPRODUCTION MACHINE. JAN. 21, 1969.
3,499,374.—XEROGRAPHIC PRINTER. MAR. 10, 1970. AUS. 0415164, BEL. 0677146, CAN. 0846424, FRA. 1470069, GRB. 1135603, ITL. 0762255, MEX. 0091183, SWD. 0327142.
3,687,541.—XEROGRAPHIC DUPLEX TECHNIQUE. AUG. 29, 1972. CAN. 0948268.
3,847,642.—METHOD FOR TRANSFERRING ELECTROSTATOGRAPHICALLY FORMED IMAGES. NOV. 12, 1974.
3,848,204.—PRESSURE ADJUSTABLE ELECTROPHOTOGRAPHIC PRINTING MACHINE TRANSFER APPARATUS. NOV. 12, 1974.
3,854,974.—METHOD FOR TRANSFERRING A TONER IMAGE. DEC. 17, 1974.
3,867,168.—TRANSPARENCY. FEB. 18, 1975.
3,888,208.—IMAGE TRANSFER PROCESS. JUNE 10, 1975.
3,932,035.—APPARATUS FOR TRANSFERRING A TONER IMAGE. JAN. 13, 1976.
3,936,174.—TRANSFER ROLLER WITH STATIONARY INTERNAL ELECTRODE. FEB. 3, 1976.
3,954,332.—REPRODUCTION MACHINE WITH IMPROVED TRANSFER ROLL. MAY 4, 1976.
3,954,333.—TRANSFER ROLL HAVING MEANS FOR MONITORING AND CONTROLLING THE RESITIVITY THEREOF. MAY 4, 1976.

Class 7E 1

2,992,758.—POWDER CLOUD GENERATING APPARATUS. JULY 18, 1961. CAN. 0678816.
3,013,878.—METHOD AND APPARATUS FOR TRANSFERRING AND FIXING XEROGRAPHIC IMAGES. DEC. 19, 1961.
3,063,859.—METHOD AND APPARATUS FOR TRANSFERRING IMAGES FROM XEROGRAPHIC TO METALLIC PLATES. NOV. 13, 1962.
3,071,070.—METHOD AND APPARATUS FOR TRANSFERRING IMAGES FROM XEROGRAPHIC TO METALLIC PLATES. JAN. 1, 1963. CAN. 0638821.
3,374,769.—TONER FUSING APPARATUS. MAR. 26, 1968. CAN. 0819836, GRB. 1152067, JAP. 0534764.
3,685,896.—DUPLICATING METHOD AND APPARATUS. AUG. 22, 1972.
3,845,742.—FUSER ROLL CONSTRUCTION. NOV. 5, 1974.
3,849,062.—REINFORCED FUSER ROLL CONSTRUCTION. NOV. 19, 1974.

Class 7E 2

2,995,085.—TRANSFER AND FIXING METHOD. AUG. 8, 1961. CAN. 0622688.
3,083,684.—APPARATUS FOR PATTERN REPRODUCTION. APR. 2, 1963.

Class 7E 3

2,661,289.—ADHESIVE TRANSFER AND FIXING APPARATUS. DEC. 1, 1953.
2,855,324.—CONTACT TRANSFER FOR XEROGRAPHY. OCT. 7, 1958. CAN. 0665467, FRA. 1170805, GER. 1036279, GRB. 0843502.
2,886,464.—CONTACT TRANSFER FOR XEROGRAPHY. MAY 12, 1959.
3,157,546.—IMAGE TRANSFER. NOV. 17, 1964. ATR. 0225034, BEL. 0602721 FRA. 1287124, GER. 1271547, GRB. 0985176, ITL. 0647042, JAP. 0414127, STZ. 0383417.
3,591,276.—METHOD AND APPARATUS FOR OFFSET XEROGRAPHIC REPRODUCTION. JULY 6, 1971. CAN. 0894931, GER. 1811893, GRB. 1245426, JAP. 0648075.
3,682,677.—BACKGROUND REMOVAL. AUG. 8, 1972.
3,690,252.—LITHOGRAPHIC INKING APPARATUS. SEPT. 12, 1972. CAN. 0919006.

Class 7E 3A

2,843,499.—PRESSURE TRANSFER OF XEROGRAPHIC IMAGES. JULY 15, 1958.
2,995,085.—TRANSFER AND FIXING METHOD. AUG. 8, 1961. CAN. 0622688.
3,003,891.—UNMOTTLED DYE TRANSFER. OCT. 10, 1961.
3,060,052.—TRANSFER OF XEROGRAPHIC DYE IMAGES. OCT. 23, 1962. AUS. 0242307, CAN. 0678380, FRA. 1246634, GRB. 0946761.

Class 8A

D.233,414.—TONER BOTTLE OR THE LIKE. OCT. 29, 1974.
2,990,278.—METHOD AND APPARATUS FOR TRANSFERRING AND FIXING XEROGRAPHIC IMAGES. JUNE 27, 1961.
3,130,064.—METHOD OF FORMING RESIN PATTERN ON A PAPER RECORD CARD. APR. 21, 1964.
3,778,222.—FIRE PREVENTION APPARATUS. DEC. 11, 1973.
3,830,590.—SORTER APPARATUS OF PRINTER SYSTEM. AUG. 20, 1974. AUS. 0466096, BEL. 0791361, CHL. 0027890, FRA. 7240557, GRB. 1400619, ITL. 0970911, MEX. 0128646, NZL. 0168971, PLP. 0008722, PTG. 0058789, SAF. 0728101, SPN. 0408628, STZ. 0560108.
3,834,861.—PRESSURE HEATED FUSER ASSEMBLY. SEPT. 10, 1974. GRB. 1424307.
3,847,391.—STACKING CONTROL APPARATUS. NOV. 12, 1974. ARG. 0194365, AUS. 0454812, BEL. 0783855, CAN. 0969205, FRA. 7218318, GRB. 1365400, ITL. 0955693, MEX. 0128712, SPN. 0403109, STZ. 0557242.
3,848,868.—SHEET SORTING APPARATUS. NOV. 19, 1974.
3,856,461.—REPRODUCTION MACHINE FUSER. DEC. 24, 1974.
3,856,462.—REPRODUCTION MACHINE FUSER. DEC. 24, 1974. BEL. 0821050.
3,868,744.—CLEANING APPARATUS FOR HEATED PRESSURE ROLL FUSER. MAR. 4, 1975. AUS. 0466542, BEL. 0794569, GRB. 1424132, ITL. 0978560, SPN. 0410976, SWD. 7301015.
3,883,921.—CLEANING ROLL APPARATUS HAVING REJUVENATED CLEANING SURFACE. MAY 20, 1975.
3,936,658.—FUSER APPARATUS FOR ELECTROSTATIC REPRODUCING MACHINES. FEB. 3, 1976.

Class 8A 1

RE.28,802.—FUSING APPARATUS. MAY 4, 1976. CAN. 0990779, GRB. 1436563.
2,586,484.—FUSING DEVICE. FEB. 19, 1952.
2,965,868.—RESISTANCE TYPE HEATING ELEMENTS. DEC. 20, 1960. CAN. 0643795, GER. 1810418, GRB. 0948916, JAP. 0319003.
3,079,483.—XEROGRAPHIC FIXING APPARATUS. FEB. 26, 1963. ARG. 0155449, CAN. 0682500, GRB. 1032955, IND. 0096312.
3,219,326.—XEROGRAPHIC FUSING APPARATUS. NOV. 23, 1965. CAN. 0716212.
3,374,769.—TONER FUSING APPARATUS. MAR. 26, 1968. CAN. 0819836, GRB. 1152067, JAP. 0534764.
3,396,401.—APPARATUS AND METHOD FOR MARKING OF INTELLIGENCE ON A RECORD MEDIUM. AUG. 6, 1968.
3,409,280.—POROUS DRUM FUSER. NOV. 5, 1968.
3,411,932.—QUALITY XEROGRAPHIC REPRODUCTIONS. NOV. 19, 1968. CAN. 0788948, FRA. 1459094, GER. 1497213, GRB. 1112000, ITL. 0725763, MEX. 0078900.
3,498,592.—HEAT FIXING APPARATUS FOR FUSIBLE MATERIAL. MAR. 3, 1970. ARG. 0180584, AUS. 0432632, BEL. 0733403, CAN. 0878082, CZC. 0164830, FRA. 6917080, GRB. 1269716, ITL. 0864984, MEX. 0111516, PNM. 0001417, SPN. 0367614, STZ. 0506821, SWD. 0345328, TIW. 0006603, USR. 0340215.

3,519,253.—SELECTIVE XEROGRAPHIC FUSER. JULY 7, 1970. ARG. 0168753, ATR. 0293871, AUS. 0416089, BEL. 0704925, CAN. 0843377, CHL. 0023289, CLB. 0017682, DNK. 0123893, FRA. 1540701, GRB. 1193355, GUA. 0002145, HUN. 0157550, ITL. 0830722, JAM. 0001850, MEX. 0107890, PRU. 0009344, SAF. 0676018, SPN. 0345919, STZ. 0470698, SWD. 0322690, TRD. 0000113, URG. 0008846, USR. 0372852, VZL. 0026101.

3,535,492.—FUSING APPARATUS. OCT. 20, 1970. ARG. 0181204, BEL. 0733663, CAN. 0872978, FRA. 6917190, GRB. 1266932, ITL. 0865914, MEX. 0110755.

3,623,710.—FIXING ARRANGEMENT. NOV. 30, 1971.

3,648,991.—METHOD AND APPARATUS FOR SELECTIVE FUSING. MAR. 14, 1972.

3,667,742.—FIXING ARRANGEMENT. JUNE 6, 1972. BEL. 0777318, CAN. 0928766, FRA. 7147890, GRB. 1368307, ITL. 0944393.

3,765,828.—FUSING APPARATUS. OCT. 16, 1973. CAN. 0991256, GRB. 1428800.

3,770,346.—METHOD AND APPARATUS FOR FUSER ASSEMBLY COOLING IN AN ELECTROSTATOGRAPHIC MACHINE. NOV. 6, 1973. GRB. 1421863.

3,781,517.—FUSER THERMAL PROTECTOR. DEC. 25, 1973.

3,792,227.—FUSER APPARATUS. FEB. 12, 1974.

3,819,259.—LIGHT ATTENUATOR. JUNE 25, 1974. GRB. 1428799.

3,826,892.—FUSING APPARATUS. JULY 30, 1974. CAN. 0990779, GRB. 1436563.

3,849,905.—FUSING APPARATUS. NOV. 26, 1974.

3,849,907.—FUSING APPARATUS. NOV. 26, 1974.

3,874,892.—ELECTROSTATOGRAPHIC FUSING PROCESS EMPLOYING REPLACEABLE LINER. APR. 1, 1975. CAN. 0980405, GRB. 1374652.

3,898,424.—RADIANT FUSER XEROGRAPHIC REPRODUCING APPARATUS. AUG. 5, 1975.

3,907,492.—FUSING APPARATUS. SEPT. 23, 1975. CAN. 0990779, GRB. 1436563.

3,939,326.—DUAL RIBBON FUSER. FEB. 17, 1976.

3,944,784.—DUAL RIBBON FUSER. MAR. 16, 1976.

3,953,709.—TWO SOURCE RADIANT FUSER FOR XEROGRAPHIC REPRODUCING APPARATUS. APR. 27, 1976.

Class 8A 1A

3,445,626.—FUSING APPARATUS WITH FLASH LAMP CIRCUIT. MAY 20, 1969. CAN. 0843525, GRB. 1180604, JAP. 1075585.

3,465,203.—FLASH LAMP FOR ELECTROSCOPIC TONER. SEPT. 2, 1969. CAN. 0843526, GRB. 1185687, JAP. 0758339.

3,474,223.—SELECTIVE FLASH FUSING. OCT. 21, 1969. CAN. 0851811, FRA. 1546257, GRB. 1208770, JAP. 0558445.

3,529,129.—REFLECTION TYPE FLASH FUSER. SEPT. 15, 1970. ARG. 0180678, BEL. 0728716, CAN. 0855311, FRA. 6004567, GRB. 1252465, ITL. 0866971, JAP. 0661180, MEX. 0107835.

3,566,076.—TONER FIXING APPARATUS. FEB. 23, 1971. CAN. 0913164, GRB. 1256471.

3,655,280.—XEROGRAPHIC FUSING METHOD AND APPARATUS. APR. 11, 1972.

3,765,828.—FUSING APPARATUS. OCT. 16, 1973. CAN. 0991256, GRB. 1428800.

3,792,227.—FUSER APPARATUS. FEB. 12, 1974.

3,819,259.—LIGHT ATTENUATOR. JUNE 25, 1974. GRB. 1428799.

3,865,081.—MAGNETIC BRUSH DEVELOPING APPARATUS. FEB. 11, 1975.

3,903,394.—READ/WRITE APPARATUS FOR MAGNETIC RECORDERS. SEPT. 2, 1975.

3,935,424.—FLASH FUSING APPARATUS. JAN. 27, 1976.

3,944,783.—HIGH EFFICIENCY NON CAVITY RADIANT METHOD AND APPARATUS. MAR. 16, 1976.

Class 8A 1B

2,852,651.—FUSING MECHANISM FOR A XEROGRAPHIC COPYING MACHINE. SEPT. 16, 1958. CAN. 0619281.

3,053,962.—XEROGRAPHIC FUSING APPARATUS. SEPT. 11, 1962. CAN. 0657396, GER. 1165413, GRB. 0999763.

3,357,401.—XEROGRAPHIC FUSER MONITORING APPARATUS. DEC. 12, 1967.

3,432,639.—FUSING APPARATUS. MAR. 11, 1969. CAN. 0851810, GRB. 1194234, JAP. 0608702.

3,437,407.—XEROGRAPHIC FUSING SYSTEM. APR. 8, 1969. CAN. 0842370, JAP. 0758338.

3,445,626.—FUSING APPARATUS WITH FLASH LAMP CIRCUIT. MAY 20, 1969. CAN. 0843525, GRB. 1180604, JAP. 1075585.

3,449,546.—INFRA-RED HEATER. JUNE 10, 1969. ARG. 0170237, ATR. 0303518, AUS. 0402657, BEL. 0700101, BRA. 6788714, CAN. 0852819, CHL. 0023085, DNK. 0118703, FRA. 1527629, GRB. 1187481, ITL. 0805313, MEX. 0101251, NOR. 0123480, PLD. 0068551, PRU. 0009320, SAF. 0673601, SPN. 0341906, STZ. 0499143, SWD. 0332936, URG. 0008615, VZL. 0026103.

3,507,333.—FIRE PREVENTION SYSTEM. APR. 21, 1970. BEL. 0722599, CAN. 0910255, FRA. 1589864, GRB. 1229495, ITL. 0845253, JAP. 0752504.

3,558,853.—FUSER SYSTEM FOR COPYING MACHINE. JAN. 26, 1971. ARG. 0186145, ATR. 0309984, AUS. 0446113, BEL. 0750389, BRA. 7019023, CAN. 0874013, CZC. 0168526, EGR. 0083065, FRA. 7017316, GRB. 1309129, ITL. 0893097, MEX. 0117915, NZL. 0160101, SPN. 0379651, STZ. 0506817, SWD. 0357840, TIW. 0006834, VZL. 0032597.

3,588,445.—FUSER CONTROL CIRCUIT. JUNE 28, 1971.

3,735,092.—FUSER CONTROL CIRCUIT FOR COPYING APPARATUS. MAY 22, 1973. CAN. 0991254, GRB. 1406655.

3,781,516.—FUSER CONTROL SYSTEM. DEC. 25, 1973.

3,790,747.—REGULATOR FOR XEROGRAPHIC FUSING APPARATUS. FEB. 5, 1974. ARG. 0200245, AUS. 0467385, BEL. 0789339, CAN. 0991252, FRA. 7234199, GRB. 1397586, ITL. 0972690, MEX. 0129168, SPN. 0409974, STZ. 0554008, SWD. 7215167, VZL. 0032607.

3,833,794.—FIXING UNIT FOR USE IN A DUPLICATING APPARATUS. SEPT. 3, 1974.

3,851,144.—FEEDBACK FUSER FOR 730S. NOV. 26, 1974.

Class 8A 1C

3,076,083.—XEROGRAPHIC FIXING APPARATUS. JAN. 29, 1963.

Class 8A 2

2,701,765.—XEROGRAPHIC FUSING APPARATUS. FEB. 8, 1955. CAN. 0530525.

3,349,702.—FUSER HAVING HEATED AND UNHEATED PORTIONS FOR PRINT FIXING PURPOSES. OCT. 31, 1967. CAN. 0833789, MEX. 0096468.

3,356,831.—XEROGRAPHIC FUSING APPARATUS. DEC. 5, 1967. CAN. 0798466, FRA. 1465786, GER. 1497228, GRB. 1117339, ITL. 0749552, JAP. 0512652.

3,584,195.—HEAT FIXING APPARATUS. JUNE 8, 1971. GRB. 1322354.

3,718,390.—MICROFICHE INDEXER. FEB. 27, 1973. ARG. 0190620, BEL. 0768712, CAN. 0946659, GRB. 1350656, ITL. 0927453, MEX. 0121626, SWD. 7107727.

3,788,873.—FIXING METHOD UTILIZING INTERMEDIATE HEAT TRANSFER. JAN. 29, 1974.

3,810,735.—HEAT FIXING APPARATUS FOR FUSIBLE MATERIAL. MAY 14, 1974.

3,849,628.—NON-CONTACT TEMPERATURE SENSOR FOR ROLL FUSER OF A XEROGRAPHIC REPRODUCTION APPARATUS. NOV. 19, 1974. GRB. 1322612.

3,881,859.—STRIPPER FINGER DESIGN TO PREVENT OIL-ON-THE-COPY. MAY 6, 1975.

3,900,590.—XEROGRAPHIC FUSING APPARATUS. AUG. 19, 1975. CAN. 0992614, GRB. 1192444.

3,904,354.—RESILIENT STRIPPER MEMBERS FORMING A PART OF A FUSER ROLL. SEPT. 9, 1975.

3,937,637.—ROLL CONTACT FUSER. FEB. 10, 1976.

3,940,235.—IMMERSIONS FUSING. FEB. 24, 1976.

3,965,855.—IMMERSION FUSING. JUNE 29, 1976.

Class 8A 2A

3,256,002.—XEROGRAPHIC FIXING DEVICE. JUNE 14, 1966. ADN. 0000470, AUS. 0295646, BRS. 00J3738, BRU. 0000569, CAN. 0796441, FIJ. 0000343, GHA. 0000995, GIB. 1089537, GIE. 0006669, GRB. 1089537, GUR. 1089537, HGK. 0009269, ISR. 0030229, JAP. 0537119, JER. 0000P98, KEN. 0001745, MAU. 1917571, MLS. 0015169, NIG. 0001618, NZL. 0148733, SBH. 0005369, SGP. 0008369, SHL. 0000018, SLN. 3677286, SRK. 0000386, STZ. 0458077, UGD. 0000369.

3,268,351.—XEROGRAPHIC FIXING METHOD AND APPARATUS. AUG. 23, 1966. JAP. 0489660.

3,291,466.—XEROGRAPHIC FIXING DEVICE. DEC. 13, 1966. CAN. 0800935, FRA. 1458647, GRB. 1122628, ITL. 0729649, JAP. 0524526, MEX. 0090836.

3,324,791.—XEROGRAPHIC ROLLER FUSER DRIVE APPARATUS. JUNE 13, 1967. CAN. 0825903, GRB. 1135744, JAP. 0512655, STZ. 0520889.

3,327,096.—TEMPERATURE CONTROL CIRCUIT. JUNE 20, 1967. CAN. 0797970, FRA. 1448641, GRB. 1113451, ITL. 0729649, JAP. 0572184, MEX. 0085994.

3,331,592.—XEROGRAPHIC FUSING APPARATUS. JULY 18, 1967. CAN. 0823589, JAP. 0512657, MEX. 0108575.
3,357,249.—TEMPERATURE SENSOR. DEC. 12, 1967. CAN. 0810332, GRB. 1171381.
3,435,500.—PRESSURE ROLL AND METHOD OF MANUFACTURING. APR. 1, 1969. ARG. 0153406, AUS. 0408490, BEL. 0670480, BRA. 0083780, CAN. 0832922, FRA. 1450156, GER. 1546792, GRB. 1124036, ITL. 0730679, JAP. 0669366, MEX. 0107366, VZL. 0024008.
3,437,032.—HEATED FUSER ROLL. APR. 8, 1969. ARG. 0155221, AUS. 0043081, BEL. 0683308, CAN. 0800936, FRA. 1484969, GRB. 1137227, ITL. 0773369, JAP. 1071499, MEX. 0093105, SPN. 0328427, STZ. 0467476, SWD. 0321410, VZL. 0023990.
3,449,548.—FUSING DEVICE. JUNE 10, 1969.
3,498,596.—HEAT FIXING APPARATUS FOR FUSIBLE MATERIAL. MAR. 3, 1970. ARG. 0181805, AUS. 0428652, BEL. 0733408, CAN. 0860450, CZC. 0150764, FRA. 6917085, GRB. 1258152, ITL. 0865073, MEX. 0111517, PNM. 0002166, SPN. 0367312, STZ. 0505411, SWD. 0345329, TIW. 0006194, USR. 0230669, VZL. 0025073.
3,539,161.—HEAT FIXING APPARATUS FOR FUSIBLE MATERIALS. NOV. 10, 1970. CAN. 0889987.
3,612,820.—HEAT FIXING APPARATUS FOR LENGTHY FUSIBLE MATERIALS. OCT. 12, 1971.
3,649,992.—CLEANING APPARATUS FOR FUSING SYSTEM. MAR. 21, 1972. CAN. 0980517, GRB. 1340684.
3,667,742.—FIXING ARRANGEMENT. JUNE 6, 1972. BEL. 0777318, CAN. 0928766, FRA. 7147890, GRB. 1368307, ITL. 0944393.
3,690,176.—TEMPERATURE SENSING APPARATUS. SEPT. 12, 1972. GRB. 1383087.
3,718,116.—OIL DISPENSING APPARATUS. FEB. 27, 1973. CAN. 0984895.
3,745,972.—WICKING APPARATUS. JULY 17, 1973. CAN. 0991251, GRB. 1397626.
3,751,216.—FUSER ROLL ASSEMBLY. AUG. 7, 1973.
3,754,819.—APPARATUS FOR PLACING ROLLERS IN CONTACT IN A PRESSURE FUSER ASSEMBLY. AUG. 28, 1973.
3,776,760.—METHOD FOR MANUFACTURING A TETRAFLUOPOETHLENE POLYMER-COATED ROLL. DEC. 4, 1973. ARG. 0199302, AUS. 0165141, BEL. 0789728, CAN. 0990149, GRB. 1410025, NZL. 0168554, SAF. 0727133, STZ. 0028514.
3,796,183.—FREE FLOATING PRESSURE BIASING APPARATUS FOR CLEANING ROLL FUSER. MAR. 12, 1974.
3,799,401.—SILICONE OIL CAPACITY CONTROL USING POLYURETHANE BELT. MAR. 26, 1974.
3,820,591.—APPARATUS FOR SENSING DIMENSION OF SHEETS OF MATERL TO BE TRNPRTD THROUGH ELCTRSTIC REPRDCTN M. JUNE 28, 1974.
3,831,553.—WICK FOR OIL DISPENSING APPARATUS. AUG. 27, 1974. CAN. 0984895.
3,852,861.—SURFACES WITH FLUOROCARBON PROCESS FOR MULTIPLE COATING RESINS. DEC. 10, 1974. ARG. 0199302, AUS. 0165141, BEL. 0789728, CAN. 0990149, GRB. 1410025, NZL. 0168554, SAF. 0727133, STZ. 0028514.
3,861,860.—DRY FUSER ROLL CLEANING APPARATUS. JAN. 21, 1975.
3,881,085.—FUSER CONTROL CIRCUIT FOR COPYING APPARATUS. APR. 29, 1975. BEL. 0808310.
3,883,291.—OIL APPLICATOR FOR REPRODUCTION MACHINE FUSER. MAY 13, 1975. BEL. 0822048.
3,883,292.—SLEEVELESS PRESSURE ROLL CLEANER. MAY 13, 1975.
3,883,293.—PRESSURE ROLL CONSTRUCTION. MAY 13, 1975.
3,902,845.—METAL FOAM UNDER CONFORMABLE SURFACE REPLACEABLE. SEPT. 2, 1975.
3,906,800.—REUSABLE NIP MEASURING DEVICE AND METHOD. SEPT. 23, 1975.
3,907,493.—VISCO-ELASTIC DAMPENER MECHANISM FOR FUSER ASSEMBLY. SEPT. 23, 1975.
3,908,589.—STRUCTURE FOR APPLYING RELEASE AGENT TO A HEATED FUSER ROLL STRUCTURE. SEPT. 30, 1975.
3,912,901.—PFA TEFLON SLEEVED CHOW PRESSURE ROLL. OCT. 14, 1975.
3,913,521.—COMPOSITE DOCTORING BLADE FOR A HEATED FUSER ROLL UTILIZED FOR FIXING TONER. OCT. 21, 1975.
3,918,397.—CONTACT FUSING APP FOR FIXING TONER IMAGES TO A SUPPORT MEMBER. NOV. 11, 1975.
3,918,804.—APP FOR APPLYING RELEASE MATERIAL TO A CONTACT FUSER ROLL MEMBER UTILIZED IN FIXNG TNR IMGS TO. NOV. 11, 1975.
3,921,573.—CLEANING SYSTEM FOR ELECTROSTATIC REPRODUCING APPARATUS. NOV. 25, 1975.
3,924,564.—FUSER APPARATUS HAVING AN ARTICULATED RELEASE MATERIAL DISPENSER. DEC. 9, 1975.
3,929,094.—ROLL FUSER. DEC. 30, 1975.
3,929,095.—ROLL FUSER. DEC. 30, 1975.
3,929,096.—ROLL FUSER. DEC. 30, 1975.
3,934,113.—ROLL FUSER APPARATUS AND MOUNTING ARRANGEMENT THEREFOR. JAN. 20, 1976.
3,934,547.—RENEWABLE CHOW FUSER COATING. JAN. 27, 1976.
3,935,836.—METERING BLADE FOR A FUSER ROLL. FEB. 3, 1976.
3,938,950.—STRIPPING APPARATUS. FEB. 17, 1976.
3,940,238.—CLEANING STRUCTURE FOR AN ELASTOMERIC FUSER MEMBER. FEB. 24, 1976.
3,940,518.—BAKE TECHNIQUE FOR MANUFACTURING TETRAFLUOROETHYLENE COATED ROLLS. FEB. 24, 1976.
3,941,558.—A CONTACT AND HEATING FIXING DEVICE FOR ELECTROPHOTOGRAPHY. MAR. 2, 1976.
3,942,887.—DRIVE MECHANISM FOR A ROLL FUSER EMPLOYED IN A COPIER APPARATUS. MAR. 9, 1976.
3,948,214.—INSTANT START FUSING APPARATUS. APR. 6, 1976.
3,955,916.—FUSER ROLL SHEET STRIPPING APPARATUS. MAY 11, 1976.
3,965,331.—DUAL MODE ROLL FUSER. JUNE 22, 1976.
3,965,332.—SELECTIVE FUSING APPARATUS. JUNE 22, 1976.
3,965,853.—CONTACT FUSER ASSEMBLY. JUNE 29, 1976.
3,965,973.—TEMPERATURE SENSING DEVICE. JUNE 29, 1976.
3,966,394.—PLURAL CLEANING ROLLS ASSEMBLY. JUNE 29, 1976.
3,968,343.—FUSER ROLL TEMPERATURE REGULATOR PROBE. JULY 6, 1976.
3,970,038.—ROLL FUSER. JULY 20, 1976.
3,973,844.—LATCHING MECHANISM FOR THE BACK-UP ROLL OF A ROLL FUSER EMPLOYED IN A COPIER APPARATUS. AUG. 10, 1976.

Class 8A 3

3,180,971.—XEROGRAPHIC FUSING APPARATUS. APR. 27, 1965. CAN. 0734734, GRB. 1027904.
3,219,799.—XEROGRAPHIC FUSING APPARATUS. NOV. 23, 1965.
3,604,892.—FUSING APPARATUS. SEPT. 14, 1971.
3,856,460.—DEVELOPING SYSTEM FOR FILM BY ADIABACTIC HEAT FLOW. DEC. 24, 1974.

Class 8A 4

3,093,039.—APPARATUS FOR TRANSFERRING POWDER IMAGES AND METHOD THEREFOR. JUNE 11, 1963. CAN. 0744873.

Class 8A 1

3,869,696.—FUSER APPARATUS. MAR. 4, 1975.

Class 8A 1A

3,869,696.—FUSER APPARATUS. MAR. 4, 1975.

Class 8A 2A

3,926,058.—CONTACT ARC REPLICATION DEVICE. DEC. 16, 1975.

Class 8B

2,684,301.—DEVICE FOR FUSING XEROGRAPHIC IMAGES. JULY 20, 1954.
2,776,907.—METHOD OF FIXING ELECTROSTATIC POWDER IMAGE. JAN. 8, 1957. CAN. 0574197.
2,922,230.—XEROGRAPHIC POWDER FIXING APPARATUS. JAN. 26, 1960.
2,995,464.—METHOD AND APPARATUS FOR FIXING XEROGRAPHIC POWDER IMAGES. AUG. 8, 1961. CAN. 0705852, FRA. 1243780, GER. 1106780, GRB. 0890911.
3,013,342.—XEROGRAPHIC FIXING APPARATUS. DEC. 19, 1961. CAN. 0616923.
3,049,810.—XEROGRAPHIC FUSING APPARATUS. AUG. 21, 1962. CAN. 0740393.
3,117,847.—XEROGRAPHIC POWDER IMAGE FIXING APPARATUS. JAN. 14, 1964.

3,132,047.—XEROGRAPHIC FIXING APPARATUS. MAY 5, 1964. AUS. 0266991, CAN. 0713996, FRA. 1332228, GER. 1571130, GRB. 1012444.
3,148,078.—XEROGRAPHIC FUSING METHOD. SEPT. 8, 1964.
3,149,931.—XEROGRAPHIC VAPOR FUSING APPARATUS. SEPT. 22, 1964. CAN. 0758518.
3,158,509.—XEROGRAPHIC FIXING APPARATUS. NOV. 24, 1964. CAN. 0762382, GRB. 1023052, JAP. 0456309.
3,215,116.—VAPOR FUSING APPARATUS. NOV. 2, 1965.
3,704,524.—APPARATUS FOR DEVELOPING LATENT ELECTROSTATIC IMAGES. DEC. 5, 1972. ARG. 0188616, BEL. 0779806, CAN. 0950655, FRA. 7208101, GRB. 1385328, MEX. 0126261.
3,884,690.—POLYESTER PHOTOCONDUCTORS AND MATRIX MATERIALS. MAY 20, 1975.
3,884,825.—IMAGING COMPOSITION. MAY 20, 1975. AUS. 0467835, BEL. 0802879, GRB. 1437041.
3,934,546.—APPARATUS FOR FIXING WITH SOLVENT VAPORS. JAN. 27, 1976.
3,940,518.—BAKE TECHNIQUE FOR MANUFACTURING TETRAFLUOROETHYLENE COATED ROLLS. FEB. 24, 1976.

Class 8B 1

3,070,900.—XEROGRAPHIC FIXING APPARATUS. JAN. 1, 1963. CAN. 0686166.
3,078,589.—XEROGRAPHIC FUSING APPARATUS. FEB. 26, 1963. CAN. 0609621, GRB. 0859788.
3,140,159.—XEROGRAPHIC FUSING AND DRYING APPARATUS. JULY 7, 1964.
3,140,160.—XEROGRAPHIC FUSING AND DRYING APPARATUS. JULY 7, 1964.
3,199,223.—XEROGRAPHIC FUSING AND DRYING APPARATUS. AUG. 10, 1965.
3,288,624.—VAPOR FUSING METHOD FOR XEROGRAPHIC POWDER IMAGES. NOV. 29, 1966.

Class 8C

2,894,840.—METHOD FOR FIXING XEROGRAPHIC IMAGES. JULY 14, 1959.
2,995,085.—TRANSFER AND FIXING METHOD. AUG. 8, 1961. CAN. 0622688.
3,158,509.—XEROGRAPHIC FIXING APPARATUS. NOV. 24, 1964. CAN. 0762382, GRB. 1023052, JAP. 0456309.
3,386,822.—SOLVENT CAPSULE FIXING OF POWDER IMAGES. JUNE 4, 1968. CAN. 0712993, FRA. 1430471, GER. 1497196, GRB. 1087201, HOL. 0132775, ITL. 0745341, JAP. 0741995.
3,940,235.—IMMERSIONS FUSING. FEB. 24, 1976.
3,965,855.—IMMERSION FUSING. JUNE 29, 1976.

Class 8C 1

3,893,760.—TRANSFER APPARATUS. JULY 8, 1975.

Class 8C 2B

3,926,824.—ELECTROSTATOGRAPHIC DEVELOPER COMPOSITION. DEC. 16, 1975. ARG. 0192480, AUS. 0466319, BEL. 0793098, CAN. 0985552, FRA. 7245403, GRB. 1417179, ITL. 0973327, STZ. 0028663.

Class 8D

2,894,840.—METHOD FOR FIXING XEROGRAPHIC IMAGES. JULY 14, 1959.
3,493,412.—TRANSFERRING XEROGRAPHIC TONER IMAGES TO A SOLID CRYSTALLINE PLASTICIZER COATED RECEIVING SURFACE. FEB. 3, 1970. CAN. 0880837, MEX. 0096609.
3,640,746.—ADHESIVE CONTACT ELECTRIFICATION IMAGING. FEB. 8, 1972.
3,861,911.—IMAGING FIXING METHOD. JAN. 21, 1975.

Class 8E

2,681,473.—MANUFACTURE OF PLAQUES AND THE LIKE. JUNE 22, 1954.
2,855,324.—CONTACT TRANSFER FOR XEROGRAPHY. OCT. 7, 1958. CAN. 0665467, FRA. 1170805, GER. 1036279, GRB. 0843502.
2,886,464.—CONTACT TRANSFER FOR XEROGRAPHY. MAY 12, 1959.
3,157,546.—IMAGE TRANSFER. NOV. 17, 1964. ATR. 0225034, BEL. 0602721, FRA. 1287124, GER. 1271547, GRB. 0985176, ITL. 0647042, JAP. 0414127, STZ. 0383417.
3,591,276.—METHOD AND APPARATUS FOR OFFSET XEROGRAPHIC REPRODUCTION. JULY 6, 1971. CAN. 0894931, GER. 1811893, GRB. 1245426, JAP. 0648075.
3,799,827.—PROCESS FOR PROTECTING THE SURFACE OF AN IMAGE. MAR. 26, 1974.
3,816,066.—XEROGRAPHIC FIXING DEVICE. JUNE 11, 1974.
3,861,219.—METHOD FOR MEASURING HEAT AND PRESSURE CHARACTERISTICS OF FUSING APP. JAN. 21, 1975.
3,888,622.—TEMPERATURE SENSING DEVICE. JUNE 10, 1975.
3,928,656.—METHOD OF DEVELOPING ELECTROSTATIC LATENT IMAGES WITH PRESSURE SENSITIVE TONER. DEC. 23, 1975. ARG. 0196320, AUS. 0464392, BEL. 0793554, FRA. 7246575, GRB. 1417409, ITL. 0973325, STZ. 0028568.
3,934,477.—TEMPERATURE SENSING DEVICE. JAN. 27, 1976.
3,936,658.—FUSER APPARATUS FOR ELECTROSTATIC REPRODUCING MACHINES. FEB. 3, 1976.

Class 8E 1

2,843,499.—PRESSURE TRANSFER OF XEROGRAPHIC IMAGES. JULY 15, 1958.
2,995,085.—TRANSFER AND FIXING METHOD. AUG. 8, 1961. CAN. 0622688.
3,003,891.—UNMOTTLED DYE TRANSFER. OCT. 10, 1961.
3,060,052.—TRANSFER OF XEROGRAPHIC DYE IMAGES. OCT. 23, 1962. AUS. 0242307, CAN. 0678380, FRA. 1246634, GRB. 0946761.

Class 9

3,836,244.—COLOR XEROGRAPHY. SEPT. 17, 1974.
3,958,878.—ELECTROSTATIC PROCESSOR HOUSING INTERCHANGABLE RESERVOIRS FOR SUPPING AND RECLAIMING TONER. MAY 25, 1976.

Class 9A

T.940,022.—PRESSURIZED AND FILTERED XEROGRAPHIC SYSTEM. NOV. 4, 1975.
3,552,850.—LUBRICATED BLADE CLEANING OF IMAGING PHOTOCONDUCTIVE MEMBERS. JAN. 5, 1971. ALB. 0003931, ARG. 0172544, ATR. 0300568, AUS. 0438884, BEL. 0727561, BRA. 6898275, BUR. 0000041, CAM. 0000453, CAN. 0869669, CHL. 0024409, CLB. 0017926, COR. 000947A, DNK 0122738, EGR. 0075946, EIR. 0032784, FRA. 6902175, GNR. 0000043, GRB. 1259513, GRK. 0039239, IND. 0119582, ISR. 0031502, ITL. 0854622, LIB. P272693, MEX. 0106799, MLG. 0003059, MLW. 00MW769, MNC. 8146975, MRC. 0014725, NOR. 0128683, NZL. 0155207, PAK. 0120897, PLD. 0017650, PLP. 0006639, PNM. 0001979, PRU. 0009588, PTG. 0051062, RHD. 5569489, SAF. 6970696, SPN. 0363130, STZ. 0493016, SWC. 0346398, TGR. 0000550, URG. 0009736, USR. 0385466, VTM. 0001840, VZL. 0023692, ZMB. 0176973.
3,635,704.—IMAGING SYSTEM. JAN. 18, 1972. ALB. 0004133, ARG. 0176978, ATR. 0303521, AUS. 0440759, BEL. 0727560, BRA. 0088093, BUR. 0000042, CAM. 0000463, CAN. 0867697, CHL. 0026254, COR. 000949A, DNK. 0131403, EGR. 0078899, EIR. 0032632, FRA. 6902174, GNR. 0000042, GRB. 1259514, GRK. 0039240, IND. 0119583, ISR. 0031503, ITL. 0871510, LAS. 0000199, LIB. 00P7269, MEX. 0106332, MLG. 0003056, MLW. 00MW869, MNC. 8156975, MRC. 0014724, NZL. 0155208, PAK. 0120859, PLP. 0008511, PNM. 0001676, PRU. 0010443, PTG. 0051063, RHD. 4169529, RMN. 0055464, SAF. 0069995, SPN. 0363127, STZ. 0513431, SWD. 0342921, SYA. 0002477, TGR. 0000551, TIW. 0005257, UAR. 0009525, USR. 0396887, VTM. 0001805, VZL. 0023744, ZMB. 0186974.
3,717,409.—CLEANING OF ELECTROSTATOGRAPHIC SURFACES. FEB. 20, 1973.
3,724,019.—WIPER BLADE CLEANING APPARATUS FOR XEROGRAPHIC MACHINES. APR. 3, 1973. CAN. 991248.
3,724,020.—WIPER BLADE CLEANER FOR XEROGRAPHIC MACHINES. APR. 3, 1973. ARG. 0194951, BEL. 0783490, CAN. 0991249, FRA. 7216778, GRB. 1399156, ITL. 0955404, MEX. 0127875.
3,838,472.—TONER CLEANING APPARATUS. OCT. 1, 1974. BEL. 0789325, CAN. 0991694, FRA. 7233424, GRB. 1403439, ITL. 0967797, SWD. 7212456.
3,847,480.—CONTINOUS BLADE CLEANER. NOV. 12, 1974.
3,848,992.—DEVELOPER BLADE CLEANING. NOV. 19, 1974.

3,848,993.—SUPPORTED DEVELOPER BLADE CLEANING. NOV. 19, 1974.
3,848,994.—LINE CHARGE TONER CLEANING. NOV. 19, 1974.
3,854,814.—TRANSLATING DWELL CLEANING SYSTEM. DEC. 17, 1974.
3,871,762.—BLADE CLEANING SYSTEM. MAR. 18, 1975.
3,918,807.—CLEANING BLADE FOR PHOTOCOPIER. NOV. 11, 1975.
3,918,809.—APPARATUS FOR CLEANING A SURFACE SUPPORT. NOV. 11, 1975.
3,940,282.—BLADE CLEANING OF SURFACE WITH REVERSE MOVEMENT. FEB. 24, 1976.
3,947,108.—CLEANING SYSTEM. MAR. 30, 1976.
3,957,509.—METHOD AND APPARATUS FOR REMOVING CONTAMINANTS FROM AN ELECTROSTATIC IMAGING SURFACE. MAY 18, 1976.

Class 9A 1

3,099,856.—WEB CLEANER APPARATUS. AUG. 6, 1963. ARG. 0146853. CAN. 0760369, GRB. 1032957, IND. 0096310, JAP. 0481944.
3,149,356.—XEROGRAPHIC PLATE CLEANING APPARATUS. SEPT. 22, 1964.
3,186,838.—XEROGRAPHIC PLATE CLEANING METHOD UTILIZING THE RELATIVE MOVEMENT OF A CLEANING WEB. JUNE 1, 1965. CAN. 0858757, FRA. 1435510, GER. 1497242, ITL. 0761145.
3,190,198.—XEROGRAPHIC CLEANING APPARATUS. JUNE 22, 1965.
3,337,891.—PLATE CLEANING AND TRANSPORTING APPARATUS. AUG. 29, 1967.
3,380,355.—XEROGRAPHIC CLEANING APPARATUS. APR. 30, 1968. CAN. 0819048.
3,405,682.—XEROGRAPHIC DEVELOPMENT APPTS WITH WEB LOADING MEANS TO REMOVE RESIDUAL DEVELOPER. OCT. 15, 1968. GRB. 1102282.
3,492,732.—WEB QUANTITY INDICATOR. FEB. 3, 1970. CAN. 0887178.
3,526,457.—CLEANING APPARATUS FOR ELECTROSTATIC COPYING MACHINES. SEPT. 1, 1970. CAN. 0880402, GRB. 1225287.
3,615,397.—METHOD OF CLEANING ELECTROSTATIC COPYING MACHINES. OCT. 26, 1971.
3,624,858.—CLEANING APPARATUS. DEC. 7, 1971.
3,664,300.—APPARATUS FOR TREATING THE SURFACE OF AN ELECTROSTATOGRAPHIC IMAGING PLATE. MAY 23, 1972.
3,725,059.—METHOD OF CLEANING AN ELECTROSTATOGRAPHIC SURFACE. APR. 3, 1973. GRB. 1337282.
3,781,107.—CLEANING APPARATUS. DEC. 25, 1973.
3,867,170.—METHOD FOR CLEANING LIQUID DEVELOPERS. FEB. 18, 1975. CAN. 0906336, GRB. 1339904.
3,879,785.—CLEANING APPARATUS. APR. 29, 1975.

Class 9A 2

3,477,450.—BRUSH RECLAIMING. NOV. 11, 1969. GRB. 1206539.
3,489,463.—BRUSH SIZING APPARATUS. JAN. 13, 1970. GRB. 1243233, JAP. 0810578.
3,493,269.—LOADING HEAD. FEB. 3, 1970. CAN. 0864392.
3,610,693.—METHOD OF MAKING A CYLINDRICAL BRUSH. OCT. 5, 1971. CAN. 0944415, GRB. 1332920, JAP. 0758464.
3,617,123.—XEROGRAPHIC CLEANING APPARATUS. NOV. 2, 1971.
3,634,077.—METHOD AND APPARATUS FOR REMOVING A RESIDUAL IMAGE IN AN ELECTROSTATIC COPYING SYSTEM. JAN. 11, 1972. BEL. 0737956, CAN. 0896611, FRA. 6929217, GRB. 1259960, ITL. 0870232, JAP. 0742513.
3,664,300.—APPARATUS FOR TREATING THE SURFACE OF AN ELECTROSTATOGRAPHIC IMAGING PLATE. MAY 23, 1972.
3,766,593.—CLEANING APPARATUS FOR INSULATING SURFACES. OCT. 23, 1973. ARG. 0194956, AUS. 0460978, BEL. 0784898, CAN. 0990017, FRA. 7219012, GRB. 1399900, ITL. 0960138, MEX. 0127720. SPN. 404266, STZ. 0538310, SWD. 7208414, VZL. 0032065.
3,947,108.—CLEANING SYSTEM. MAR. 30, 1976.
3,957,509.—METHOD AND APPARATUS FOR REMOVING CONTAMINANTS FROM AN ELECTROSTATIC IMAGING SURFACE. MAY 18, 1976.

Class 9A 2A

2,751,616.—BRUSH CLEANING DEVICE. JUNE 26, 1956.
3,278,972.—XEROGRAPHIC PLATE CLEANING APPARATUS. OCT. 18, 1966. CAN. 0774795, FRA. 1458646, GER. 1497218, GRB. 1122624, ITL. 0729648, JAP. 0512649.
3,534,427.—CLEANING APPARATUS FOR ELECTROSTATIC PRINTING MACHINES. OCT. 20, 1970. AUS. 0425369, BEL. 0729977, CAN. 0873426, CZC. 0157666, FRA. 6907700, GRB. 1238117, HUN. 0158312, ITL. 0876795, JAP. 0645593, SWD. 0345533, USR. 0372853.
3,590,412.—BRUSH CLEANING DEVICE FOR ELECTROSTATIC MACHINES. JULY 6, 1971. CAN. 0930107, GRB. 1248521.
3,660,863.—CLEANING APPARATUS. MAY 9, 1972. ARG. 0188292, ATR. 0324838, AUS. 0445312, BEL. 0752937, CAN. 0925659, CHL. 0027132, DNK. 0129483, EGR. 0084130, FRA. 7024664. GRB. 1259446, GUA. 0002676, IND. 0127312, ITL. 0900201, MEX. 0115163, NOR. 0133164, NZL. 0160666, PLP. 0007492, PNM. 0002014, PTG. 0054074, SAF. 0704533, SPN. 0381388, STZ. 0514165, SWD. 0359942, TIW. 0007784, USR. 0384250, VZL. 0032417.
3,692,402.—MATERIALS FOR FIBROUS DEVELOPMENT AND CLEANING MEMBER. SEPT. 19, 1972.
3,740,789.—XEROGRAPHIC ROLLER OSCILLATING CLEANING BLADE WITH DRIVE MECHANISM THEREFOR. JUNE 26, 1973. BEL. 0789327, CAN. 0991250, FRA. 7233724, GRB. 1403440, ITL. 0967796.
3,742,551.—TONER CLEANING AND STORAGE APPARATUS. JULY 3, 1973. BEL. 0789325, CAN. 0991694, FRA. 7233424, GRB. 1403439, ITL. 0967797, SWD. 7212456.
3,788,454.—CHAIN BEAD DRIVE APPARATUS. JAN. 29, 1974.
3,795,025.—ELECTROPHOTOGRAPHIC PHOTORECEPTOR CLEANING APPARATUS. MAR. 5, 1974.
3,807,853.—ELECTROPHOTOGRAPHIC CLEANING APPARATUS. APR. 30, 1974.

Class 9A 2B

2,484,782.—METHOD OF REMOVING ELECTROSCOPIC POWDER FROM AN ELECTROPHOTOGRAPHIC PLATE. OCT. 11, 1949.
2,752,271.—ELECTROSTATIC CLEANING OF XEROGRAPHIC PLATES. JUNE 26, 1956.
2,832,977.—ELECTROSTATIC CLEANING DEVICE. MAY 6, 1958.
3,404,418.—SHEET TRANSPORT APPARATUS. OCT. 8, 1968. CAN. 0859327.
3,572,923.—CLEANING METHOD AND APPARATUS FOR ELECTROSTATIC COPYING MACHINES. MAR. 30, 1971. ARG. 0172603, AUS. 0429490, BEL. 0737957, CAN. 0884822, FRA. 6929174, GRB. 1259890, ITL. 0870233, MEX. 0113040, SPN. 0370878, SWD. 0348851.
3,655,373.—CLEANING METHOD FOR ELECTROSTATIC COPYING MACHINE. APR. 11, 1972.
3,668,008.—IONIZED AIR CLEANING DEVICE. JUNE 6, 1972. CAN. 0956406, GRB. 1310836.
3,722,018.—CLEANING APPARATUS. MAR. 27, 1973.
3,738,745.—FUR BRUSH ERASER. JUNE 12, 1973. CAN. 0970554, GRB. 1418036.

Class 9A 2B 1

2,987,660.—XEROGRAPHIC CHARGING. JUNE 6, 1961.
3,128,683.—XEROGRAPHIC APPARATUS. APR. 14, 1964.

Class 9A 2C

3,252,274.—XEROGRAPHIC POWDER FILTER. MAY 24, 1966. CAN. 0712876, GER. 1278245, GRB. 1031634, JAP. 0502993.
3,410,060.—XEROGRAPHIC FILTER APPARATUS. NOV. 12, 1968. CAN. 0810976, FRA. 1458648, GRB. 1114505, ITL. 0729638, JAP. 0724232.
3,570,224.—FILTER FOR ELECTROSTATOGRAPHIC DEVELOPER. MAR. 16, 1971.
3,641,979.—TONER RECLAIMING SYSTEM. FEB. 15, 1972. CAN. 0913351.
3,793,986.—TONER RECLAIMING SYSTEM FOR ELECTROSTATIC PRINTING MACHINES. FEB. 26, 1974. ARG. 0194370, AUS. 0464194, BEL. 0784636, GER. 0978341, GRB. 1373721, ITL. 0956416, MEX. 0128265, SPN. 403.704, STZ. 0546970.
3,816,157.—TONER RECLAIMING METHOD. JUNE 11, 1974.

Class 9B

2,772,991.—PROCESS OF CLEANING A RESIDUAL POWDER IMAGE FROM AN ELECTROPHOTOGRAPHIC PLATE. DEC. 4, 1956.
2,874,064.—XEROGRAPHIC CLEANER. FEB. 17, 1959.
3,332,328.—XEROGRAPHIC DEVELOPER SEAL AND PROCESS. JULY 25, 1967. CAN. 0792684, GRB. 1138394, JAP. 0512658, MEX. 0091318.
3,607,160.—LIGRCIN CONTAINING PUMICING COMPOSITION. SEPT. 21, 1971.
3,610,749.—IMAGING SYSTEM. OCT. 5, 1971. CAN. 0923541, GRB. 1339905, JAP. 0745767.
3,646,910.—DEVELOPMENT APPARATUS FOR LATENT ELECTROSTATIC IMAGES. MAR. 7, 1972.
3,668,008.—IONIZED AIR CLEANING DEVICE. JUNE 6, 1972. CAN. 0956406, GRB. 1310836.
3,697,263.—METHOD OF CLEANING RESIDUAL LIQUID DEVELOPER FROM ELECTROPHOTOGRAPHIC PLATES. OCT. 10, 1972. ARG. 0181940, AUS. 0455091, BEL. 0758060, CAN. 0906334, EGR. 0087483, FRA. 7041623, GRB. 1328406, ITL. 0916264, MEX. 0116862, SPN. 0385000, STZ. 0519186, SWD. 0365624, TIW. 0006850, USR. 0349206.
3,834,804.—COPYING MACHINE WITH MEANS FOR MOUNTING CARRIER BEAD PICKOFF ROLLER THEREIN. SEPT. 10, 1974.

Class 9B 1

2,911,330.—MAGNETIC BRUSH CLEANING. NOV. 3, 1959.
3,920,329.—BACKGROUND REMOVAL APPARATUS. NOV. 18, 1975.

Class 9B 2

RE.28,566.—CLEANING APPARATUS. OCT. 7, 1975. CAN. 0913310, MEX. 0113698.
3,424,615.—METHOD AND APPARATUS FOR CLEANING XEROGRAPHIC PLATES. JAN. 28, 1969. CAN. 0842022, GRB. 1158521, JAP. 0561239.
3,580,673.—CLEANING APPARATUS-REISSUED AS RE28566-D2266R. MAY 25, 1971. CAN. 0913310, MEX. 0113698.
3,615,398.—METHOD FOR ELECTROSTATIC COPYING INCLUDING AN IMPROVED PROCESS OF CLEANING PHOTOCONDUCTV SRFACE. OCT. 26, 1971.
3,625,683.—PROCESS FOR CLEANING A PHOTO-CONDUCTIVE DRUM OF RESIDUAL TONER PARTICLES AND REUSE OF THE SAME. DEC. 7, 1971. CAN. 0937800, GRB. 1329982.
3,628,950.—METHOD OF REMOVING THE RESIDUAL TONER PARTICLES FROM A PHOTOCONDUCTIVE SURFACE. DEC. 21, 1971.
3,640,707.—IMAGING SYSTEM. FEB. 8, 1972.
3,655,375.—INTERMITTENT GRIT REMOVAL PROCESS. APR. 11, 1972. CAN. 0924493, GRB. 1341404.
3,656,948.—SELECTED REMOVAL OF LIQUID DVLPR IN CYCLICAL ELECTROPHOTOGRAPHIC PROCESS. APR. 18, 1972. CAN. 0906335, GRB. 1335054, JAP. 0760503.
3,776,631.—LIQUID DEVELOPER CLEANING SYSTEM. DEC. 4, 1973.

Class 9B 3

2,987,660.—XEROGRAPHIC CHARGING. JUNE 6, 1961.
3,128,683.—XEROGRAPHIC APPARATUS. APR. 14, 1964.
3,483,034.—PROCESS OF CLEANING XEROGRAPHIC PLATES. DEC. 9, 1969. CAN. 0800825, FRA. 1463257, GER. 1497235, GRB. 1125594, ITL. 0750154.
3,592,678.—LIQUID DONOR DEVELOPMENT WITH ELECTROPHORETIC CLEANING. JULY 13, 1971.
3,620,800.—CLEANING LIQUID DEVELOPED ELECTROSTATIC IMAGES BY CONTACT WITH VAPORIZED CLEANING FLUID. NOV. 16, 1971. CAN. 0933997.
3,628,981.—LIQUID TONER DEVELOPMENT. DEC. 21, 1971. ARG. 0181932.
3,671,290.—IMAGING SYSTEM. JUNE 20, 1972.
3,702,303.—CLEANING OF PHOTOCONDUCTIVE INSULATING SURFACES. NOV. 7, 1972. CAN. 0944650.
3,762,950.—CLEANING OF PARTICLES FROM A SURFACE. OCT. 2, 1973. ARG. 0195076, AUS. 0464713, BEL. 7916681, CAN. 0974009, FRA. 7241538, GRB. 1400238, ITL. 0971072, MEX. 0128580, SPN. 0408837, STZ. 0553433, VZL. 0032005.
3,849,171.—METHOD FOR CLEANING BACKGROUND AREAS FROM DEVELOPED RECORDING SURFACES. NOV. 19, 1974. CAN. 0941882.
3,862,801.—METHOD OF CLEANING AN ELECTROSTATOGRAPHIC IMAGING SURFACE. JAN. 28, 1975. GRB. 1337282.
3,937,665.—PHOTORECEPTOR SOLVENT CLEANER. FEB. 10, 1976.

Class 15

3,693,517.—PRINTING APPARATUS — KALEIDOSCOPE PRINTER WITH CIRCUMFERENTIAL STRIPS. SEPT. 26, 1972. CAN. 0948265, GRB. 1330327.
3,801,319.—IMAGING METHOD UTILIZING CHEMICAL REACTIVITIES OF PHOTOEXCITED STATES OF AROMATIC HYDROXY COMPD. APR. 2, 1974. GRB. 1429501.
3,847,644.—IMAGING BY PHASE AGGREGATION FROM BLOCK COPOLYMERS. NOV. 12, 1974.
3,851,584.—CHEMICAL REPRODUCTION SYSTEMS. DEC. 3, 1974.
3,888,670.—IMAGING METHOD. JUNE 10, 1975.
3,915,706.—IMAGING SYSTEM BASED ON PHOTODEGRADABLE POLYALDEHYDES. OCT. 28, 1975.
3,923,514.—METHOD FOR THE PREPARATION OF RELIEF PRINTING MASTERS. DEC. 2, 1975.
3,929,477.—IMAGE PRODUCING TECHNIQUES OF SUPERCONDUCTING MATERIAL IN A MAGNETIC FIELD. DEC. 30, 1975.
3,930,858.—HEAT DEVELOPMENT PROCESS UTILIZING A PHOTOSENSITIVE COMPOSITION CONTAINING A HALOGENATED POLYME. JAN. 6, 1976.
3,963,491.—IMAGING METHOD. JUNE 15, 1976.

Class 15 1

3,887,845.—COPIER PHOTORECEPTOR CHARGE CONTROL. JUNE 3, 1975.

Class 10

3,945,728.—AN ALARM FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. MAR. 23, 1976.

Class 10A

D.230,085.—COPY PAPER CASSETTE. JAN. 22, 1974.
2,738,705.—FILE-HOLDING DEVICE FOR CAMERA COPY SUPPORT. MAR. 20, 1956.
2,758,503.—COPY-HOLDING APPARATUS. AUG. 14, 1956.
2,822,172.—SHEET HANDLING MACHINE. FEB. 4, 1958. CAN. 0570493.
3,100,112.—DOCUMENT FEED MECHANISM. AUG. 6, 1963. GRB. 1015635, JAP. 0478676.
3,152,528.—DOCUMENT CARRIER. OCT. 13, 1964. CAN. 0707048, FRA. 1414049, GER. 1197744, GRB. 1032954, ITL. 0737307, JAP. 0471310.
3,220,275.—DOCUMENT DRIVE TRANSMISSION. NOV. 30, 1965.
3,239,215.—DOCUMENT FEED MECHANISM. MAR. 8, 1966. CAN. 0741548, GRB. 1052820, JAP. 0497188.
3,239,220.—DOCUMENT CONVEYOR. MAR. 8, 1966. CAN. 0770495, FRA. 1434188, GRB. 1094188, ITL. 0742434.
3,326,548.—CARD CONVEYING APPARATUS HAVING A ROTARY FRONT GAUGE. JUNE 20, 1967. CAN. 0793702, MEX. 0086197.
3,370,844.—CARD HANDLING-SCANNING DEVICE. FEB. 27, 1968.
3,409,356.—CONVEYOR FOR DOCUMENTS. NOV. 5, 1968. FRA. 1500227, GER. 1267233, GRB. 1162982, ITL. 0776597.
3,409,357.—APPARATUS FOR AN ELECTROSTATIC MACHINE. NOV. 5, 1968. CAN. 0816416, GRB. 1151104, JAP. 0542588.
3,419,264.—DOCUMENT HANDLING SYSTEM. DEC. 31, 1968. ARG. 0168399, CAN. 0831413, CHL. 0024536, JAM. 0002459, MEX. 0101167, PRU. 0009340, URG. 0009205, VZL. 0023735.
3,424,528.—DOCUMENT CONVEYOR UNIT. JAN. 28, 1969. CAN. 0842644, GRB. 1175596.
3,446,554.—XEROGRAPHIC REPRODUCING APPARATUS. MAY 27, 1969. ARG. 0171943, ATR. 0302040, AUS. 0451715, BEL. 0708649, CAN. 0880187, FRA. 1567148, GRB. 1223426, HUN. 0158170, ITL. 0823019, JAP. 0657008, LXB. 0055166, MEX. 0101029, NOR. 0127833, PLD. 0069795, SPN. 0348801, STZ. 0485581, SWD. 0354529, USR. 0259733, VZL. 0023685.
3,504,908.—DOCUMENT FEEDING APPARATUS CONTROL. APR. 7, 1970.
3,520,605.—DOCUMENT SCAN DRIVE AND RETURN APPARATUS. JULY 14, 1970. CAN. 0858848.

3,578,316.—DRIVING APPARATUS FOR ARTICLE FEEDERS. MAY 11, 1971. CAN. 0907653.
3,614,090.—DOCUMENT CONVEYOR. OCT. 19, 1971. ARG. 0183554, AUS. 0451766, BEL. 0751308, CAN. 0922330, EGR. 0081784, FRA. 7019911, GRB. 1311766, ITL. 0893688, MEX. 0118182, SPN. 0380271, STZ. 0512751, SWD. 0362150, TIW. 0007678, USR. 0349152, VZL. 0032780.
3,628,408.—STAMP DISPENSER. DEC. 21, 1971. GRB. 1324699, JAP. 0755787.
3,628,786.—DOCUMENT HANDLING APPARATUS. DEC. 21, 1971. CAN. 0942552, GRB. 1329989.
3,630,515.—DOCUMENT HANDLING APPARATUS. DEC. 28, 1971.
3,630,519.—DOCUMENT FEED APPARATUS. DEC. 28, 1971. CAN. 0903779, GRB. 1329747.
3,649,447.—APPARATUS FOR DECURLING A PAPER WEB. MAR. 14, 1972. CAN. 0916185, GRB. 1288846.
3,674,363.—SHEET FEEDING APPARATUS. JULY 4, 1972. ARG. 0176106, ATR. 0307230, AUS. 0447387, BEL. 0734129, DNK. 0131336, FRA. 6919121, GRB. 1263192, ITL. 0866189, MEX. 0112842, SPN. 0368216, STZ. 0501500, SWD. 0356136, TIW. 0006604.
3,804,514.—DUAL FUNCTION DOCUMENT STOP FOR A COPYING DEVICE. APR. 16, 1974. GRB. 1424060.
3,846,020.—ELECTROSTATIC SHEET TRANSPORT SYSTEM. NOV. 5, 1974.
3,860,339.—COPYING MACHINE. JAN. 14, 1975.
3,861,673.—BI-DIRECTIONAL SHEET TRANSPORT. JAN. 21, 1975.
3,874,651.—REGISTRATION EDGE FOR AUTOMATIC DOCUMENT HANDLER. APR. 1, 1975.
3,884,408.—APPARATUS FOR EJECTING A STAPLED SET OF SHEETS SIDEWISE FROM THE COLLATING BINS. MAY 20, 1975.
3,885,782.—SHEET FEEDER. MAY 27, 1975. CAN. 3885782.
3,888,581.—SEMI-AUTOMATIC DOCUMENT HANDLER. JUNE 10, 1975.
3,888,582.—SEMI-AUTOMATIC DOCUMENT HANDLER. JUNE 10, 1975.
3,888,584.—SEMI-AUTOMATIC DOCUMENT HANDLER. JUNE 10, 1975.
3,888,585.—SEMI-AUTOMATIC DOCUMENT HANDLER. JUNE 10, 1975.
3,900,258.—EXPOSURE APPARATUS. AUG. 19, 1975. GRB. 1424242.
3,901,594.—SEMI-AUTOMATIC DOCUMENT HANDLER. AUG. 26, 1975.
3,909,129.—DOCUMENT FEEDING APPARATUS. SEPT. 30, 1975.
3,915,447.—HORIZONTAL PLATEN BELT TRANSPORT. OCT. 28, 1975.
3,941,376.—AUTOMATIC DOCUMENT HANDLER-ARDRI ADH PLATEN TRANSPORT MOUNTING. MAR. 2, 1976. BEL. 0799234, CAN. 0993906, FRA. 7316540, GRB. 1421427, ITL. 0987317.
3,941,473.—MANUAL ASSIST DOCUMENT FEEDER. MAR. 2, 1976.
3,944,365.—DOCUMENT FEEDING APPARATUS AND LATCHING MECHANISM. MAR. 16, 1976.
3,944,794.—COPYING SYSTEM CONTROL. MAR. 16, 1976. ARG. 0204710, BEL. 0808230, FRA. 7343289, ITL. 1002162, SPN. 0421150, STZ. 0577391.
3,947,111.—DOCUMENT FEEDING APPARATUS. MAR. 30, 1976.
3,953,122.—DOCUMENT ORIGINAL HANDLING SYSTEM. APR. 27, 1976.
3,954,259.—DOUBLE BAR SEPARATOR FOR A SHEET RECEIVING TRAY. MAY 4, 1976.
3,959,573.—COMPOSITIONS AND METHODS FOR MAKING BIASABLE MEMBERS. MAY 25, 1976.
3,963,345.—PRE-COLLATION COPYING. JUNE 15, 1976.
3,977,780.—ELECTROSTATIC REPRODUCTION METHOD AND APPARATUS. AUG. 31, 1976.
3,981,498.—NON-UNIFORM CHARGING OF SHEET MATERIAL. SEPT. 21, 1976.
3,982,832.—ELECTROSTATOGRAPHIC COPYING MACHINES. SEPT. 28, 1976.

Class 10B

3,094,036.—IMAGE SELECTOR APPARATUS. JUNE 18, 1963. CAN. 0683832.
3,139,279.—RECORD CARD MAGAZINE. JUNE 30, 1964. CAN. 0717868.
3,180,637.—RECORD CARD FEEDING APPARATUS. APR. 27, 1965. CAN. 0806932.
3,357,574.—SEQUENTIAL CONTROL SYSTEM. DEC. 12, 1967. CAN. 0824898.
3,383,105.—CARD PICK-OFF APPARATUS. MAY 14, 1968. CAN. 0820743, GRB. 1193512, JAP. 0610154.
3,482,917.—CARD TRANSPORT APPARATUS. DEC. 9, 1969. CAN. 0842646, GRB. 1193516.
3,784,303.—AUTOMATIC MICROFICHE COPIER. JAN. 8, 1974. GRB. 1412221.

Class 10C

2,956,804.—VACUUM FEED ASSEMBLY FOR FLAT PIECES. OCT. 18, 1960.
3,239,213.—DOCUMENT FEEDER. MAR. 8, 1966. CAN. 0766646, FRA. 1447269, GER. 1243698, GRB. 1087786, ITL. 0761046, JAP. 0497197.
3,506,257.—DOCUMENT FEEDING APPARATUS. APR. 14, 1970. CAN. 0885333, GRB. 1253416.
3,567,214.—SHEET FEEDING AND SEPARATING APPARATUS. MAR. 2, 1971. BEL. 0734128, CAN. 0902124, FRA. 6919122, GER. 1929105, GRB. 1263193, ITL. 0866188, SPN. 0368173, STZ. 0501501, SWD. 6908176.
3,861,671.—LIFTABLE BAIL BAR FOR ALLOWING RETURN OF MULTIPLY SEPARATED SHEETS TO STACK. JAN. 21, 1975.
3,895,790.—MOVABLE BAIL BAR. JULY 22, 1975. BEL. 0815050.
3,936,180.—XEROGRAPHIC APPARATUS WITH SAMPLE PRINT CAPABILITIES. FEB. 3, 1976. BEL. 0809398.

Class 10D

3,239,213.—DOCUMENT FEEDER. MAR. 8, 1966. CAN. 0766646, FRA. 1447269, GER. 1243698, GRB. 1087786, ITL. 0761046, JAP. 0497197.
3,495,904.—RADIANT ENERGY PROTECTIVE APPARATUS. FEB. 17, 1970.
3,581,000.—INCREMENTAL STEPPING PAPER DRIVE. MAY 25, 1971.
3,618,123.—FACSIMILE DRUM CONVEYOR. NOV. 2, 1971. ARG. 0181314, BEL. 0743659, CAN. 0918186, FRA. 6944287, GER. 1963786, GRB. 1280340, ITL. 0880304, MEX. 0122967, SPN. 0374915, SWD. 0363457, VZL. 0025438.
3,790,159.—AUTOMATIC DOCUMENT HANDLING DEVICE. FEB. 5, 1974. GRB. 1417793.
3,815,899.—SHEET DELIVERY DEVICE. JUNE 11, 1974. CAN. 0994377.
3,854,715.—CAM. DEC. 17, 1974.

Class 10E

3,288,459.—DOCUMENT FEEDING APPARATUS. NOV. 29, 1966. CAN. 0788345, JAP. 0632541, MEX. 0086958.
3,300,208.—COPY POSITIONING APPARATUS AND METHOD. JAN. 24, 1967. CAN. 0817270, JAP. 0605646, MEX. 0090842.
3,473,035.—DOCUMENT TRANSPORT AND REGISTRATION SYS USING PHOTOCELLS. OCT. 14, 1969. ARG. 0170131, CAN. 0858983, CHL. 0024005, JAM. 0001926, MEX. 0101674, PRU. 0009301, URG. 0009238, VZL. 0023677.
3,510,125.—DOCUMENT REGISTRATION SYSTEM. MAY 5, 1970. BEL. 0726865, CAN. 0897195, FRA. 2000318, GER. 1902112, GRB. 1253417, ITL. 0854755, JAP. 0783473.
3,558,223.—DOCUMENT CENTERING APPARATUS. JAN. 26, 1971.
3,630,611.—DOCUMENT REGISTRATION APPARATUS. DEC. 28, 1971.
3,630,620.—PLATEN COVER FOR COPYING MACHINES. DEC. 28, 1971. CAN. 0921307, GRB. 1309313.
3,642,370.—DOCUMENT PRESENTATION DEVICE. FEB. 15, 1972. GRB. 1206633.
3,724,941.—ELECTROPHOTOGRAPHIC APPARATUS. APR. 3, 1973.
3,741,644.—ORIGINAL POSITION CONFIRMING MEANS FOR DUPLICATING APPARATUS. JUNE 26, 1973.
3,771,082.—COPYING APPARATUS WITH AUXILIARY LIGHT SOURCE FOR ILLUMINATING AN ORIGINAL TO BE REPRODUCED. NOV. 6, 1973.
3,829,082.—AUTOMATIC DOCUMENT HANDLER. AUG. 13, 1974. CAN. 0986958, GRB. 1421425.
3,854,715.—CAM. DEC. 17, 1974.
3,861,673.—BI-DIRECTIONAL SHEET TRANSPORT. JAN. 21, 1975.
3,877,804.—CORNER REGISTRATION DEVICE FOR DOCUMENT FEEDER. APR. 15, 1975.
3,883,134.—DETECTING AND REMOVING APPARATUS FOR SKEW FED SHEETS. MAY 13, 1975.
3,915,447.—HORIZONTAL PLATEN BELT TRANSPORT. OCT. 28, 1975.

Class 10F

3,288,464.—CARD INVERTING APPARATUS. NOV. 29, 1966. CAN. 0803316, JAP. 0547200.
3,408,140.—DOCUMENT HANDLING APPARATUS. OCT. 29, 1968. CAN. 0842643, GRB. 1143062.
3,416,791.—DOCUMENT INVERTING APPARATUS. DEC. 17, 1968. CAN. 0853562, GRB. 1210564, JAP. 0648074.
3,844,654.—DUPLEX COPYING SYSTEM. OCT. 29, 1974. FRA. 7340246.
3,862,802.—SHEET REVERSING APPARATUS AND A DUPLEX REPRODUCING APPARATUS EMPLOYING SAME. JAN. 28, 1975. BEL. 0818894.
3,926,338.—THERMALLY INSENSITIVE PARTICLE CONCENTRATION CONTROLLER. DEC. 16, 1975.

Class 10G

2,889,029.—LABEL APPLYING MACHINE. JUNE 2, 1959.
2,925,167.—CONVEYOR FOR ARTICLES IN IMBRICATING. FEB. 16, 1960.
3,419,265.—DOCUMENT STACKER APPARATUS. DEC. 31, 1968. ARG. 0171423, CAN. 0833415, CHL. 0024006, JAM. 0001859, MEX. 0100967, PRU. 0001930, URG. 0009140, VZL. 0023736.
3,460,825.—FAN FOLD STACKING APPARATUS. AUG. 12, 1969. CAN. 0855586, GRB. 1205418.
3,497,207.—SORTING APPARATUS FOR DOCUMENTS. FEB. 24, 1970. BEL. 0727203, CAN. 0895731, FRA. 6900957, GRB. 1245841, HOL. 0148006, ITL. 0854588.
3,630,517.—COUNTER STACKER. DEC. 28, 1971.
3,729,188.—DOCUMENT STACKER APPARATUS. APR. 24, 1973. FRA. 0701711, GRB. 1303165, ITL. 0893040.
3,865,480.—ELECTROSTATIC CONTROL OF FAN FOLD PAPER STACKING. FEB. 11, 1975.

Class 10H

3,467,371.—SHEET DISTRIBUTOR. SEPT. 16, 1969. ARG. 0168293, ATR. 0294140, AUS. 0423257, BEL. 0702898, CAN. 0925803, CHL. 0023102, CLB. 0017542, DNK. 0124250, EIR. 0031306, FIN. 0047869, FRA. 1541084, GRB. 1193513, GRK. 0038675, IND. 0112000, ISR. 0028519, ITL. 0813836, JAP. 0645588, LXB. 0054335, MEX. 0099952, NOR. 0124920, NZL. 0149788, PAK. 0118964, PLP. 0006507, PRU. 0009477, PTG. 0048210, SAF. 0674986, SPN. 0344349, STZ. 0480253, SWD. 0337384, TRK. 0015492, URG. 0008974, VZL. 0026276.
3,815,896.—AUTOMATIC DOCUMENT HANDLER. JUNE 11, 1974. BEL. 0797889, CAN. 0984863, FRA. 7316287, GRB. 1421426, ITL. 0987316, SPN. 0414486.
3,884,408.—APPARATUS FOR EJECTING A STAPLED SET OF SHEETS SIDEWISE FROM THE COLLATING BINS. MAY 20, 1975.
3,907,277.—METHOD AND DEVICE FOR REMOVING DOCUMENTS FROM A PLATEN. SEPT. 23, 1975.
3,913,467.—COLLATING APPARATUS. OCT. 21, 1975.
3,944,207.—LIMITLESS SORTER. MAR. 16, 1976.
3,944,366.—SLIDING PLATEN COVER APPARATUS. MAR. 16, 1976.
3,963,345.—PRE-COLLATION COPYING. JUNE 15, 1976.

Class 10I

3,495,904.—RADIANT ENERGY PROTECTIVE APPARATUS. FEB. 17, 1970.
3,600,610.—TIME DELAY CIRCUIT FOR A RADIANT ENERGY PROTECTIVE APPARATUS. AUG. 17, 1971.
3,609,737.—METHOD AND APPARATUS FOR ARTICLE DETECTION UTILIZING CORONA DISCHARG. SEPT. 28, 1971. CAN. 0872468, GER. 1932248, GRB. 1259998, JAP. 0657911.
3,672,760.—XEROGRAPHIC PLATE TRANSPORTING MECHANISM. JUNE 27, 1972. CAN. 0939555, GRB. 1359888.
3,674,363.—SHEET FEEDING APPARATUS. JULY 4, 1972. ARG. 0176106, ATR. 0307230, AUS. 0447387, BEL. 0734129, DNK. 0131336, FRA. 6919121, GRB. 1263192, ITL. 0866189, MEX. 0112842, SPN. 0368216, STZ. 0501500, SWD. 0356136, TIW. 0006604.
3,697,063.—DOCUMENT HANDLING APPARATUS. OCT. 10, 1972. GRB. 1369618.
3,744,047.—SUPERPOSED SHEET DETECTION. JULY 3, 1973. CAN. 0985762, FRA. 7231694, GRB. 1396560, ITL. 0967501.
3,748,088.—FUSER CONTROL APPARATUS. JULY 24, 1973.
3,778,618.—PHOTODETECTION OF NON-OPAQUE OBJECTS TRANSPRTD ALONG A CONVEYOR BY USE OF A LIGHT BLCKING OPAQU. DEC. 11, 1973. GRB. 1406170.
3,790,158.—AUTOMATIC DOCUMENT HANDLER. FEB. 5, 1974. GRB. 1421428.
3,894,513.—COPYING MACHINE WITH BEAD PICKOFF ROLLER. JULY 15, 1975.

Class 10K

3,945,546.—ZIG ZAG FOLDED STRIP BOTTOM FEEDER. MAR. 23, 1976.

Class 12A

3,384,488.—POLYCHROMATIC PHOTOELECTROPHORETIC IMAGING COMPOSITION. MAY 21, 1968.
3,384,565.—PROCESS OF PHOTOELECTROPHORETIC COLOR IMAGING. MAY 21, 1968. ARG. 0149921, ATR. 0304268, AUS. 0414156, BEL. 0667116, BRA. 0087920, CAN. 0867678, CLB. 0014706, FRA. 1450843, GRB. 1124626, GRK. 0030605, IND. 0119647, ISR. 0023973, ITL. 0744030, JAP. 681941, LXB. 0049058, MEX. 0091899, NOR. 0128733, NZL. 0142323, PPU. 0009538, PTG. 0044324, SAF. 653922, SPN. 0321858, STZ. 0481409, SWD. 6509579, URG. 0009540. VZL. 0017273.
3,384,566.—METHOD OF PHOTOELECTROPHORETIC IMAGING. MAY 21, 1968.
3,734,610.—MICROFICHE VIEWER-COPIER WITH BILLING DATA STORAGE. MAY 22, 1973.
3,759,611.—MICROIMAGE RANSOM ACCESS AND RETRIEVAL PRINTER. SEPT. 18, 1973. CAN. 0987156, GRB. 1427017.

Class 12B

3,383,993.—PHOTOELECTROPHORETIC IMAGING APPARATUS. MAY 21, 1968. ARG. 0165160, AUS. 0419734, BEL. 0692048, CAN. 0866143, FRA. 1507051, GRB. 1158301, GRK. 0033285, ITL. 0862555, LXB. 0052738, MEX. 0096357, PTG. 0044324, SAF. 0067022, SPN. 0335121, STZ. 0510901, VZL. 0024450.
3,610,748.—PHOTOELECTROPHORETIC IMAGING SYSTEM. OCT. 5, 1971. BEL. 0752438, CAN. 0922569, FRA. 7023045, GRB. 1319532, ITL. 0894621, JAP. 0739527.
3,656,847.—ELEVATOR MECHANISM. APR. 18, 1972.
3,663,396.—KINESCOPE PHOTOELECTROPHORETIC IMAGING METHODS AND SYSTEMS. MAY 16, 1972. ARG. 0196858, BEL. 0762417, CAN. 0935965, FRA. 7104350, GRB. 1345571, ITL. 0918121, JAP. 0743838, MEX. 0131834.
3,697,409.—BELT ELECTRODE IMAGING SYSTEM. OCT. 10, 1972. ARG. 0183572, BEL. 0760077, BRA. 7023343, CAN. 0937803, FRA. 7045072, GRB. 1339734, ITL. 0913368, JAP. 0752721, MEX. 0119368, VZL. 0032930.
3,844,779.—PHOTOELECTROPHORETIC IMAGING METHOD EMPLOYING A BELT ELECTRODE. OCT. 29, 1974.

Class 12C

3,427,242.—APPARATUS FOR CONTINUOUS PHOTOELECTROPHORETIC IMAGING. FEB. 11, 1969. BEL. 0743902, CAN. 0851701, FRA. 1521727, GER. 1572385, GRB. 1185932, ITL. 0794269, JAP. 0580245, MEX. 0097005.
3,474,019.—PHOTOELECTROPHORETIC IMAGING MTD INC. CONTACTNG IMGNG SUSPNSN W/ ALG SFC OF FLEXIBLE ELECTRODE. OCT. 21, 1969. AUS. 0418224, BEL. 0692912, BRA. 6678842, CAN. 0834679, GRK. 0033301, LXB. 0052730, MEX. 0090286, PTG. 0046984, SAF. 0670024, SPN. 0335454.
3,551,320.—IMAGING APPARATUS. DEC. 29, 1970.
3,600,081.—IMAGING APPARATUS. AUG. 17, 1971. ARG. 0192211, ATR. 0324839, AUS. 0455820, BEL. 0758903, CAN. 0936732, CZC. 0164288, EGR. 0090482. FRA. 7041652, GRB. 1335990, ITL. 0909307, JAP. 0751878, MEX. 0122272, PNM. 0002094, SPN. 0385453, STZ. 0518582, SWD. 0362717, TIW. 0008461, USR. 0412697, VZL. 0032926.
3,609,028.—IMAGING APPARATUS. SEPT. 28, 1971. ARG. 0186570, ATR. 0319749, AUS. 0455572, BEL. 0758806, CAN. 0935012, EGR. 0086977, FRA. 7041648, GRB. 1335988, ITL. 0909306, MEX. 0121331 PNM. 0002167, SPN. 0385452, STZ. 0518580, SWD. 0361753, TIW. 0007385, USR. 0465806, VZL. 30683.
3,622,691.—HIGH SPEED LIGHT RESPONSIVE TRANSFORM COMPUTER FOR A LIGHT-SENSITIVE PRINTING SYSTEM. NOV. 23, 1971. CAN. 0915813, GRB. 1335222, JAP. 0774709.

3,642,365.—AUTOMATED IMAGING MACHINE. FEB. 15, 1972. ARG. 0183571, ATR. 0324123, AUS. 0456428, BEL. 0758902, CAN. 0937440, EGR. 0091986, FRA. 7041647, GRB. 1337145, ITL. 0909311, JAP. 0758463, MEX. 0120289, PNM. 0002255, SPN. 0385457. STZ. 0544327, SWD. 0367493, TIW. 0007386.

3,642,606.—APPARATUS FOR IMAGE FORMATION ON THE INSIDE OF A CYLINDER. FEB. 15, 1972. ARG. 0183573, BEL. 0760749, BRA. 7022094, CAN. 0938490, FRA. 7047632, GRB. 1339578, ITL. 0913902, JAP. 0752722, MEX. 0119589, VZL. 0032929.

3,644,035.—FLAT PLATE TRAVELING ROLLER IMAGING. FEB. 22, 1972. ARG. 0183670, AUS. 0456429, BEL. 0758904, BRA. 7023406, CAN. 0923356, EGR. 0090280, FRA. 7041653, GRB. 1335051, ITL. 0909308, JAP. 0751879, MEX. 0119530, SPN. 0385454, STZ. 0528763, SWD. 0367074, TIW. 0008460, USR. 0404290, VZL. 30682.

3,645,616.—PHOTOELECTROPHORETIC IMAGE TRANSFER APPARATUS. FEB. 29, 1972. CAN. 0949049, GRB. 1337417, JAP. 783768.

3,647,290.—PHOTOELECTROPHORETIC IMAGING SYSTEM. MAR. 7, 1972. ARG. 0184762, AUS. 0454820, BEL. 0058902, CAN. 0939954, EGR. 0090483, FRA. 7061651, GER. 1337416, GRB. 1337416, ITL. 0909312, JAP. 0751880, MEX. 0119752, SPN. 0385458, STZ. 0530662, SWD. 0366850, TIW. 0007384, USR. 0419062, VZL. 30685.

3,667,842.—IMAGING APPARATUS. JUNE 6, 1972. ARG. 0193347, BEL. 0768538, CAN. 0953559, FRA. 7122750, GRB. 1350395, ITL. 0927384, MEX. 0123298.

3,703,335.—MULTIPLE EXPOSURE IMAGING APPARATUS. NOV. 21, 1972. BEL. 0760457, CAN. 0968605, FRA. 7047141, GRB. 1339550, ITL. 0913636, JAP. 0759479.

3,719,484.—PHOTOELECTROPHORETIC IMAGING METHOD. MAR. 6, 1973. CAN. 0957890, GRB. 1369701.

3,728,018.—IMAGING APPARATUS. APR. 17, 1973. CAN. 0924156, GRB. 1335697.

3,800,743.—MATERIALS APPLICATION APPARATUS. APR. 2, 1974.

3,860,336.—PHOTOELECTROPHORETIC IMAGING MACHINE AND APPTS FOR CONTACTING A ROLLER TO A SURFACE TO BE CONTACT. JAN. 14, 1975.

3,860,337.—MULTIPLE EXPOSURE METHOD AND APPARATUS. JAN. 14, 1975. CAN. 0957890, GRB. 1369701.

Class 12D

3,448,025.—PHOTOELECTROPHORETIC IMAGING SYSTEM UTILIZING A PROGRAMMED POTENTIAL APPLICATION. JUNE 3, 1969. ARG. 0167580, AUS. 0417981. BEL. 0719188, CAN. 0875492, FRA. 0095530, GER. 1797123, GRB. 1149666, ITL. 0890086, MEX. 0100805, VZL. 0025946.

3,485,738.—PHOTOELECTROPHORETIC IMG PROCESS EMPLOYNG LAYER OF INSULATNG LIQUID TO IMPROVE IMAGE QUALITY. DEC. 23, 1969. AUS. 0431891, BEL. 0743640, CAN. 0850591, GER. 1522751, GRB. 1174831, JAP. 0578397.

3,565,614.—IMAGE TRANSFER. FEB. 23, 1971. ARG. 0157773, AUS. 0413930, BEL. 0696853, CAN. 0890362, FRA. 1520919, GER. 1572384, GRB. 1185931, ITL. 0801198, JAP. 0586922, MEX. 0099070, SPN. 0349966, STZ. 0482230, SWD. 0332754, VZL. 0024013.

3,582,205.—IMAGING APPARATUS. JUNE 1, 1971.

3,616,398.—PHOTOELECTROPHORETIC IMAGING COMPOSITION CONTAINING B-CAROTENE. OCT. 26, 1971.

3,657,103.—ELECTRODE IMAGING SYSTEM. APR. 18, 1972. CAN. 0890360, GRB. 1309663, JAP. 0731609.

3,697,407.—PREVENTION OF ARCING IN AN ELECTRODE IMAGING SYSTEM. OCT. 10, 1972. CAN. 0884225, GRB. 1309127, JAP. 0731608.

3,697,408.—IMAGING SYSTEM. OCT. 10, 1972. CAN. 0890361, GRB. 1312733, JAP. 0731610.

3,708,286.—PHOTOELECTROPHORETIC IMAGING WITH ULTRASONIC VIBRATION DURING IMAGING. JAN. 2, 1973. ARG. 0174613, ATR. 0293874, AUS. 0455712, BEL. 0739747, CAN. 0922141, FRA. 6933738, GER. 1949416, GRB. 1279285, HOL. 0146950, ITL. 0877873, JAP. 0709042, MEX. 0108820.

3,853,556.—METHOD FOR ELIMINATING ELECTRICAL ARCING DURING PHOTOELECTROPHORETIC IMAGING. DEC. 10, 1974.

Class 12E

3,535,221.—PHOTOELECTROPHORETIC IMAGING SYSTEM EMPLOYING A PHOTOCONDUCTOR COATING FOR THE BLOCKING ELECTRO. OCT. 20, 1970. ARG. 0176485, AUS. 0448560, BEL. 0722301, CAN. 0891971, FRA. 1587938, GRB. 1236619, ITL. 0845022, JAP. 0693378, MEX. 0108364, VZL. 0023742.

3,595,771.—METHOD OF REMOVING ACCUMULATED CHARGES IN PHOTOELECTROPHORETIC IMAGING. JULY 27, 1971. ARG. 0198476, ATR. 0302041, AUS. 0448837, BEL. 0737549, CAN. 0922955, FRA. 6927969, GER. 1941463, GRB. 1267255, ITL. 0869935, JAP. 0704156, SWD. 0341726.

3,639,224.—PHOTOELECTROPHORETIC IMAGING SYSTEM. FEB. 1, 1972. CAN. 0922568, GRB. 1313683, JAP. 0739526.

3,657,103.—ELECTRODE IMAGING SYSTEM. APR. 18, 1972. CAN. 0890360, GRB. 1309663, JAP. 0731609.

3,669,872.—IMAGING SYSTEM. JUNE 13, 1972.

3,775,107.—IMAGING SYSTEM. NOV. 27, 1973.

3,859,576.—HIGH PERFORMANCE BLOCKING ELECTRODE FOR ELECTROPHOTOPHORESIS. JAN. 7, 1975. BEL. 0810802.

3,866,572.—FORAMINOUS ELECTROSTATOGRAPHIC TRANSFER SYSTEM. FEB. 18, 1975. BEL. 0815546, FRA. 7418641, SPN. 0426760.

3,956,524.—METHOD FOR THE PREPARATION OF ELECTROSTATOGRAPHIC AND PHOTORECEPTORS. MAY 11, 1976.

3,966,466.—PHOTOELECTROPHORETIC IMAGING PROCESS USING DARK CHARGE INJECTING AGENT ON BLOCKING ELECTRODE. JUNE 29, 1976.

3,967,961.—PHOTOELECTROPHORETIC IMAGING PROCESS EMPLOYING A DARK CHARGE INJECTING AGENT-AKLYD RESIN COATING. JULY 6, 1976.

3,980,477.—PHOTOELECTROPHORESIS WITH DARK CHARGE INJECTING ELEMENT. SEPT. 14, 1976.

Class 12F

3,695,755.—PHOTOELECTROPHORETIC CAMERA. OCT. 3, 1972. CAN. 0958580, GRB. 1359694.

3,702,289.—PHOTOELECTROPHORETIC PROC-ESS AND APPARATUS. NOV. 7, 1972. CAN. 0958579, GRB. 1359695.

3,705,766.—PHOTOELECTROPHORETIC APPARATUS. DEC. 12, 1972. CAN. 0955100, GRB. 1359862.

Class 12G

3,655,550.—ELECTROSTATIC PIGMENT FILTER. APR. 11, 1972.

3,656,200.—CLEANING APPARATUS. APR. 18, 1972.

3,658,687.—APPARATUS FOR FORMING IMAGES WITH APPLICATOR SHEARING SMOOTHING AND CLEANING MEANS. APR. 25, 1972. CAN. 0916433, GRB. 1337149.

3,659,302.—CLEANING APPARATUS. MAY 2, 1972.

3,673,632.—CLEANING APPARATUS. JULY 4, 1972.

3,686,035.—CLEANING APPARATUS. AUG. 22, 1972. CAN. 0925660, GRB. 1335989.

3,821,027.—METHOD OF CLEANING ACCUMULATED MATERIAL FROM A SLOT. JUNE 28, 1974.

3,919,737.—CLEANING APPARATUS. NOV. 18, 1975.

3,945,724.—VELOCITY COMPOSITION FOR BEAD BYPASS. MAR. 23, 1976.

3,950,088.—VELOCITY COMPENSATION FOR BEAD BYPASS WITH SPEED REDUCTION. APR. 13, 1976.

Class 12H

3,505,131.—PROCESS FOR THE PREPARATION OF A CUPROUS IODIDE CONDUCTIVE FILM. APR. 7, 1970. CAN. 0876074, GER. 1800653, GRB. 1244012, JAP. 0615874.

3,623,680.—CLUTCH/BRAKE MECHANISM. NOV. 30, 1971.

3,623,805.—DRIVE MECHANISM FOR IMAGING APPARATUS. NOV. 30, 1971.

3,628,859.—IMAGING MACHINE IMPROVEMENT. DEC. 21, 1971. BEL. 0760455, CAN. 0937436, GRB. 1339549, ITL. 0913635, JAP. 0764505.

3,630,615.—METHOD AND APPARATUS FOR TRANSPORTING SUPPORT MATERIAL. DEC. 28, 1971.

3,630,884.—TRANSPARENT ELECTRODE IMAGING IMPROVEMENT. DEC. 28, 1971. CAN. 0890359, GRB. 1313696, JAP. 0739525.

3,639,049.—COPY SYSTEM. FEB. 1, 1972.

3,640,616.—OPAQUE ILLUMINATION AND SCANNING SYSTEM. FEB. 8, 1972. CAN. 0926674. GRB. 1337418, JAP. 0731615.

3,647,294.—MATERIALS APPLICATION AND CLEANING APPARATUS FOR XEROGRAPHIC APPARATUS. MAR. 7, 1972. CAN. 0913355, GRB. 1337146.

3,654,654.—CLEANING APPARATUS. APR. 11, 1972. CAN. 0925257, GRB. 1335850, JAP. 0791054.
3,673,632.—CLEANING APPARATUS. JULY 4, 1972.
3,681,064.—PHOTELCTROPHRTC IMNG PROCS EMPLYNG MULTI-COMPNT ELCTRCLY PHOTOSNTV PARTICLE. AUG. 1, 1972.
3,685,897.—PHOTOELECTROPHORETIC APPARATUS USING PYRAMID GEARS. AUG. 22, 1972. CAN. 0957542.
3,687,109.—MATERIALS APPLICATION APPARATUS. AUG. 29, 1972. CAN. 0915907, GRB. 1337148.
3,697,167.—OPTICAL PROJECTION APPARATUS. OCT. 10, 1972. BEL. 0772913, CAN. 0955090. FRA. 7134731, GRB. 1316023, ITL. 0936735.
3,703,459.—LIQUID APPLICATOR. NOV. 21, 1972.
3,718,393.—IMAGING APPARATUS. FEB. 27, 1973.
3,722,993.—MATERIALS APPLICATION APPARATUS. MAR. 27, 1973.
3,730,620.—FOCUSING METHOD. MAY 1, 1973.
3,737,221.—ROTATIONAL DRIVE MECHANISM. JUNE 5, 1973.
3,744,897.—TRANSPARENT ELECTRODE FOR ELECTROPHORETIC IMAGING. JULY 10, 1973.
3,769,850.—PHOTOELECTROPHORETIC APPARATUS USING PYRAMID GEARS. NOV. 6, 1973.
3,776,628.—PHOTOELECTROPHORETIC IMAGING SYSTEM. DEC. 4, 1973.
3,784,294.—IMAGE DENSITY CONTROL. JAN. 8, 1974.
3,840,299.—PHOTOELECTROPHORETIC IMAGING APP FOR VARYING ADVANCING RATE OF VELOCITY OF ROLLER ELECTRODES. OCT. 8, 1974.
3,844,651.—PHOTELCTRPHRTC IMG APP FOR CONTRLNG TIME INTRVL OF SUCSSV ROLLR ELCTRDS LEAVNG AND ENTERNG IMG RE. OCT. 29, 1974.
3,920,330.—ELECTROPHORETIC IMAGING APPARATUS. NOV. 18, 1975. BEL. 0777719, FRA. 7201005, GRB. 1376241, ITL. 0946357.
3,944,353.—BACKGROUND REDUCTION. MAR. 16, 1976.
3,950,640.—LAMP CONTROL AND LAMP SWITCH CIRCUIT FOR CONTROLLING LIGHT BALANCE. APR. 13, 1976.
3,952,700.—LIQUID APPLICATOR. APR. 27, 1976.
3,954,465.—ELECTROPHORETIC IMAGING METHODS. MAY 4, 1976. BEL. 0777719, FRA. 7201005, GRB. 1376241, ITL. 0946357.
3,957,510.—OVERFLOW PREVENTION FOR LIQUID BETWEEN FLEXIBLE LAYERS ON A SOLID SURFACE. MAY 18, 1976.
3,981,459.—PHOTOELECTROPHORETIC ELECTROSTATIC TACKING CAPSTAN WEB TENSION SYS. SEPT. 21, 1976.
3,982,710.—PHOTOELECTROPHORETIC WEB TENSION SYSTEM. SEPT. 28, 1976.

Class 12I

3,681,064.—PHOTELCTROPHRTC IMNG PROCS EMPLYNG MULTI-COMPNT ELCTRCLY PHOTOSNTV PARTICLE. AUG. 1, 1972.
3,820,987.—PHOTOELECTROPHORETIC IMAGING WITH FIXING ON A SEPARATE ELECTRODE. JUNE 28, 1974.

Class 12J

3,642,364.—TRANSFER APPARATUS. FEB. 15, 1972. AUS. 0455718, BEL. 0758808, CAN. 0918412, CZC. 0164906, EGR. 0087486, FRA. 7041650, GRB. 1336720, ITL. 0909310, SPN. 0385456, STZ. 0518581, USR. 0406387.
3,791,823.—PHOTOELECTROPHORETIC IMAGING TRANSFER METHOD. FEB. 12, 1974.
3,861,911.—IMAGING FIXING METHOD. JAN. 21, 1975.
3,897,143.—IMAGING SYSTEM. JULY 29, 1975.

Class 12K

3,510,419.—PHOTOELECTROPHORETIC IMAGING METHOD. MAY 5, 1970. ARG. 0165519, AUS. 0425666, BEL. 0717829. CAN. 0876044, FRA. 0095234, GRB. 1242262, ITL. 0896927, JAP. 0657876, MEX. 0102064, PNM. 0001975, PRU. 0010174, VZL. 0023693.
3,561,864.—ELECTROPHORETIC COATING DEVICE. FEB. 9, 1971. ARG. 0174608, ATR. 0302815, AUS. 0447649, BEL. 0739544, CAN. 0890357, FRA. 6933095, GER. 1949861, GRB. 1277806, ITL. 0873705, JAP. 0686763, MEX. 0113013.
3,609,029.—MATERIALS APPLICATION APPARATUS. SEPT. 28, 1971. BEL. 0772565, CAN. 0953097, FRA. 7133987, GRB. 1366382, ITL. 0936510.
3,619,053.—PHOTOELECTROPHORETIC IMAGING SYSTEM. NOV. 9, 1971. GRB. 1324102.
3,620,948.—PHOTOELECTROPHORETIC IMAGING SYSTEM EMPLOYING PRELIMINARY ELECTROPHRIC DSPSTN OF IMAGNG SUSPENS. NOV. 16, 1971. ATR. 0326480, AUS. 0447819, BEL. 0739754, CAN. 0899137, FRA. 6933734, GRB. 1280027, HOL. 0146951, ITL. 0877872, JAP. 0709041, MEX. 0114889, SPN. 0372065, STZ. 0508232, SWD. 0341929, VZL. 0015070.
3,645,874.—IMAGE DENSITY CONTROL IN PHOTOELECTROPHORETIC IMAGING. FEB. 29, 1972. BEL. 0756899, CAN. 0922957, FRA. 7035803, GRB. 1331621, ITL. 0908434, JAP. 0743836.
3,658,687.—APPARATUS FOR FORMING IMAGES WITH APPLICATOR SHEARING SMOOTHING AND CLEANING MEANS. APR. 25, 1972. CAN. 0916433, GRB. 1337149.
3,695,755.—PHOTOELECTROPHORETIC CAMERA. OCT. 3, 1972. CAN. 0958580, GRB. 1359694.
3,744,896.—IMAGING SYSTEM. JULY 10, 1973.
3,769,009.—INKING SYSTEM FOR LIQUID PARTICLE MIGRATION ON AUTOMATIC MACHINE. OCT. 30, 1973. HOL. 7216013.
3,938,088.—CHARACTER CODING AND RECOGNITION SYSTEM. FEB. 10, 1976.
3,944,353.—BACKGROUND REDUCTION. MAR. 16, 1976.
3,968,271.—COATING APPARATUS AND USE THEREOF. JULY 6, 1976.

Class 12L

3,622,691.—HIGH SPEED LIGHT RESPONSIVE TRANSFORM COMPUTER FOR A LIGHT-SENSITIVE PRINTING SYSTEM. NOV. 23, 1971. CAN. 0915813, GRB. 1335222, JAP. 0774709.
3,649,515.—PHOTOGRAPHIC MASKING SYSTEM. MAR. 14, 1972. CAN. 0936733, GRB. 1349610, JAP. 0774711.
3,715,209.—ELECTRICAL COLOR MASKING FOR A PHOTOELECTROPHORETIC IMAGING PROCESS. FEB. 6, 1973. BEL. 0763539, CAN. 0938491, FRA. 7107557. GRB. 1347139, ITL. 0918979, JAP. 0752723, MEX. 0120935.
3,810,758.—PHOTOGRAPHIC MASKING SYSTEM. MAY 14, 1974.

Class 12M

RE.27,117.—METAL FREE PHTHALOCYANINE IN THE NEW X-FORM-RE OF 3,357,989-D1170. APR. 20, 1971.
3,384,632.—ARYLAZO-4-ISOPROPOXY-1-NAPHTHOL COMPOUNDS. MAY 21, 1968. BEL. 0743897, CAN. 0787920, FRA. 1473703, GER. 1644400, GRB. 1145374, ITL. 0764015, JAP. 0578398.
3,402,177.—SUBSTITUTED 1-CYANO-2, 3-PHTHALOYL-7, 8-BENZOPYRROCOLINES. SEPT. 17, 1968. AUS. 0435189, BEL. 0743896, CAN. 0812820, GRB. 1145373.
3,432,415.—ELECTROPHORETIC IMG. PROCESS USING PHOTOSENSITIVE XANTHENONIUM SALTS. MAR. 11, 1969. AUS. 0439502, BEL. 0743895, CAN. 0851118, GER. 1522701, GRB. 1155747, JAP. 0650631, MEX. 0104632.
3,442,781.—PHOTOELECTROPHORETIC AND XEROGRAPHIC IMG. PROC. EMPL. TRIPHENODLOXAZINES AS ELECTRIC. PHOTOSENSIT. MAY 6, 1969. BEL. 0743894, CAN. 0855152, GRB. 0175452, JAP. 0611634.
3,445,227.—ELECTROPHOTOGRAPHIC IMAGING PROCESSES EMPLOYING 2,4 DIAMINOTRIAZINES AS ELCTRCLY PHOTOSNSTV PRT. MAY 20, 1969. BEL. 0743891, CAN. 0852681, GER. 1522687, GRB. 1146019, JAP. 0617789.
3,447,922.—ELECTRICALLY PHOTOSENSITIVE PARTICLES USEFUL IN PHOTOELECTROPHORETIC AND XEROGRAPHIC IMAGING PROC. JUNE 3, 1969.
3,448,028.—N-SBSTUD-8,13-DIOXODINAPHTHO-2-1-B,2,3-D-FURAN-6-CARBOXAMIDES AS ELCTLY PTOSNSTV MTLS IN ELCPHG. JUNE 3, 1969.
3,448,029.—ELECTROPHORETIC IMAGING PROCESS USING 8,13-DIOXODINAPHTO-2,1-B,2,3-D-FURAN-6-CARBOXAMIDE PIGMEN. JUNE 3, 1969.
3,448,030.—ELECTRICALLY PHOTOSENSITIVE PART. USEFUL IN PHOTOELECTROPHORETIC AND XEROGRAPHIC IMAGING PROCESSE. JUNE 3, 1969. BEL. 0743893, CAN. 0943830, GRB. 1155554, JAP. 0686735.
3,474,020.—PHOTOELECTROPHORETIC IMAGING PROCESS USING QUINACRIDONES. OCT. 21, 1969. ARG. 0154377, AUS. 0414491, BEL. 0683405, CAN. 0834673, FRA. 0090574, GRB. 1155403, ITL. 0842587, JAP. 0601872, MEX. 0088935, SWD. 6608734, VZL. 0023989.

3,478,064.—1,5-BIS-SUBSTITUTED ALKYLAMINO-ANTHRAQUINONES. NOV. 11, 1969. ARG. 0145636, AUS. 0419687, BEL. 0683222, CAN. 0880309, FRA. 1484968, GRB. 0155985, ITL. 0771955, JAP. 0581828, MEX. 0092775, SPN. 0328428, STZ. 0461273, SWD. 0328188, VZL. 0021224.

3,485,633.—ELECTROPHORETIC IMG PROC EMPL METALLIC LAKES OF FLUORESCEIN DERIVATIVES AS ELECTRICLY PHOTOSENS. DEC. 23, 1969. AUS. 0444394, BEL. 0743641, CAN. 0848386, GRB. 1190965, JAP. 0586923.

3,492,308.—PROCESS FOR PREPARING METAL FREE PHTHALOCYANINES - SYNTHESIS OF METAL-FREE PHTHALOCYANINE. JAN. 27, 1970. CAN. 0922708, GRB. 1216887, JAP. 0586926.

3,492,309.—SYNTHESIS OF ALPHA METAL-FREE PHTHALOCYANINE. JAN. 27, 1970. CAN. 0894803, GRB. 1206306, JAP. 0604155.

3,531,309.—COMPOSITIONS COMPRISING 1-CYANO-2,3-PHTHALOYL-7,8-BENZOPYRROCOLINES AND A CARRIER. SEPT. 29, 1970.

3,546,085.—PHOTOELECTROPHORETIC IMAGING PROCESS AND SUSPENSION. DEC. 8, 1970. BEL. 0710052, CAN. 0875493, FRA. 1568088, GRB. 1208812, ITL. 0823929, JAP. 0594741.

3,560,360.—PHOTOELECTROPHORETIC IMAGING PROCESS AND ANTHRAQUINONES AS THE ELECTRICALLY PHOTOSENSITIVE PARTIC. FEB. 2, 1971. CAN. 0850590, MEX. 0096584.

3,562,248.—BISAZO PGMTS DRVD CPLRS OBTD CONDG 8-AMINO-2-NAPHTHOLS W/ DICARBOXYLIC ACID CHLORIDES. FEB. 9, 1971. ATR. 0302037, AUS. 0435392, BEL. 0743422, CAN. 0889836, FRA. 6944290, GER. 1717183, GRB. 1217905, ITL. 0879047, JAP. 0608727.

3,574,182.—CALCIUM SALT OF 6-BROMO-1-1-SULFO-2-NAPHTHYLAZO-2-NAPHTHOL. APR. 6, 1971. ARG. 0168131, ATR. 0302812, AUS. 0429649, BEL. 0710053, CAN. 0878483, CHL. 0024254, CLB. 0018785, DNK. 0128493, FIN. 0049711, FRA. 1556484, GRB. 1197374, GRK. 0036648, IND. 0114221, ISR. 0029376, ITL. 0823989, JAP. 0605213, LXB. 0055364, MEX. 0099564, NOR. 0129593, NZL. 0151403, PRU. 0009483, PTG. 0049036, SAF. 0068559, SPN. 0349965, STZ. 0524844, SWD. 0351737, URG. 0008893, VZL. 0032776.

3,594,163.—METHOD OF CONVERTING ALPHA PHTHALOCYANINE TO THE X FORM. JULY 20, 1971.

3,615,558.—PHOTOLECTROPHORETIC IMAGING PROCESS EMPLOYING A FINELY-DIVIDED PHTHALOCYANINE PIGMENT. OCT. 26, 1971. CAN. 0850022.

3,616,393.—PHOTOELECTROPHORETIC IMAGING PROCESS EMPLOYING A PIGMENT HAVING THE FORMULA RNS. OCT. 26, 1971.

3,634,221.—PIGMENT RECLAIMING. JAN. 11, 1972. BEL. 0744760, CAN. 0921427, FRA. 7001822, GRB. 1301382, ITL. 0886625.

3,635,981.—PHOTOELECTROPHORETIC IMAGING PIGMENT COMPOSITION AND PROCESS. JAN. 18, 1972. ARG. 0193337, ATR. 0305459, AUS. 0448778, BEL. 0741064, CAN. 0953143, FRA. 6937772, GRB. 1285610, JAP. 0685461, MEX. 0114879.

3,645,883.—PHTELCTRPHRTC IMGNG APRTUS EMPLYNG PHTSNSTV PRTCLS EXHBTG FATIGUE CHARACTERISTICS. FEB. 29, 1972.

3,652,438.—PHTELCTRPHRTC IMGNG PROCS USNG DIVLNT HVY MTL SLT OR 1-1-SULFO-2-NAPHYLZO-2-NAPHLS AS IMGNG MAT. MAR. 28, 1972.

3,658,675.—PHOTOELECTROPHORETIC IMAGING PROCESS USING BISAZO PIGMENTS. APR. 25, 1972.

3,692,517.—PHOTOELECTROPHORETIC IMAGING PROCESS EMPLOYING AN INSULATING CARRIER LQD CNTNG UNSATURATED COMP. SEPT. 19, 1972. ARG. 0164485, AUS. 0430397, BEL. 0715670, CAN. 0913968, FRA. 1563583, GER. 1772522, GRB. 1225316, ITL. 0834948, JAP. 0641521, MEX. 0100255, VZL. 0032921.

3,705,901.—PHOTOELECTROPHORETIC IMAGING COMPOSTION. DEC. 12, 1972.

3,753,708.—PHOTOELECTROPHORETIC IMAGING PROCESS EMPLOYING QUINACRIDONE PIGMENTS. AUG. 21, 1973.

3,758,305.—PHOTOELECTROPHORETIC IMAGING PROCESS. SEPT. 11, 1973.

3,825,422.—IMAGING PROCESS. JULY 23, 1974. CAN. 0984201.

3,867,141.—PHOTOELCTRC AND ELCTRPHOTGRPHC PGMNTS COMPRISNG DERIVATIVS OF CNDNSD PLYCLC AROMTC HYDROCRBN ALDE. FEB. 18, 1975.

3,922,169.—PHOTOELECTRIC AND ELECTROPHOTOGRAPHIC PIGMENTS COMPRISING DERIVATIVES OF CONDENSED POLYCYCLIC A. NOV. 25, 1975.

3,923,506.—PHOTOELECTRIC AND ELECTROPHOTOGRAPHIC PIGMENTS COMPRISING DERIVATIVES OF CONDENSED POLYCYCLIC A. DEC. 2, 1975.

3,953,462.—IMAGING PROCESS. APR. 27, 1976. ARG. 0202139, BEL. 0821400.

3,957,829.—CERTAIN DINAPHTHO (1,2-B;2',3'-D)-FURAN-7,12 DIONES. MAY 18, 1976.

Class 12N

3,446,722.—ELECTROPHORETIC REFINING OF PHOTOSENSITIVE PARTICLES. MAY 27, 1969. AUS. 0424699, BEL. 0743903, CAN. 0840368. GER. 1622376, GRB. 1189636.

3,473,940.—PREPARATION OF PHOTOELECTROPHORETIC IMAGING SUSPENSION. OCT. 21, 1969. BEL. 0743899, CAN. 0847808, FRA. 1524448, GER. 1572386, GRB. 1161780, ITL. 0794432, JAP. 0594583, MEX. 0097623.

3,477,934.—IMAGING PROCESS. NOV. 11, 1969. ARG. 0158372, AUS. 0416251, BEL. 0700645, CAN. 0850023, FRA. 1550998, GRB. 1196044, ITL. 0804665, JAP. 0725097, MEX. 0098737, SPN. 0342376, STZ. 0481408, SWD. 0336525, VZL. 0021263.

3,551,313.—IMAGE CONTRAST CONTROL IN PHOTOELECTROPHORETIC IMAGING - PHAROS CONTRAST CONTROL. DEC. 29, 1970. ATR. 0302814, AUS. 0448317, BEL. 0738218, CAN. 0899689, FRA. 6929449, GER. 1944510, GRB. 1274525, ITL. 0871538, JAP. 0708365, SWD. 0341130.

3,553,093.—COLOR PHOTOELECTROPHORETIC IMAGING PROCESS. JAN. 5, 1971. ATR. 0286783, AUS. 0416331, BEL. 0692911, CAN. 0818388, FRA. 1471745, GER. 1522743, GRB. 1149665, IND. 0104183, ISR. 0025304. ITL. 0762674, JAP. 0608337, MEX. 0089790, NOR. 0123368, NZL. 0144531, STZ. 0479099, SWD. 0334540.

3,586,615.—PHOTOELECTROPHORETIC IMAGING PROCESS INCLUDING THE USE OF AN ELECTRICALLY CHRGD SUSPNSN COATNG. JUNE 22, 1971. BEL. 0743921, CAN. 0891972, FRA. 6945567, GER. 1965460, GRB. 1284429, HOL. 1284429, ITL. 0880418, JAP. 0729281.

3,595,770.—SEQUENTIAL PHOTOELECTROPHORETIC IMAGING SYSTEM. JULY 27, 1971. ARG. 0176384, ATR. 0299697, AUS. 0429715, BEL. 0722300, BRA. 0087996, CAN. 0891970, CHL. 0024332, DNK. 0126879, FRA. 1589548, GRB. 1239259, ITL. 0845021, LXB. 0057101, MEX. 0103850, NZL. 0154114, PNM. 0001418, PTG. 0050485, SAF. 0686705, SPN. 0359239, STZ. 0496265, SWD. 0339172, URG. 0009317, VZL. 0023705.

3,601,483.—IMAGING APPARATUS. AUG. 24, 1971.

3,607,256.—FULLY-ENCLOSED ELECTROPHORETIC IMAGING SYSTEM. SEPT. 21, 1971.

3,616,390.—ELECTROPHORETIC IMAGING METHOD CHARACTERIZED BY EXPOSURE OF ELECTRCLY PHOTSNSTV PRTCLS AT LIQUI. OCT. 26, 1971. ATR. 0322980, AUS. 0448380. BEL. 0743423, CAN. 0890356, FRA. 6944288, GRB. 1249546, ITL. 0879048, JAP. 0688351.

3,616,395.—PHOTOELECTROPHORETIC IMAGING WITH CORONA FIELD APPLICATION. OCT. 26, 1971. CAN. 0922142, GRB. 1318565, JAP. 0756962.

3,620,950.—ELECTROPHORETIC IMAGING EMPLOYING PERIODIC ELECTROMAGNETIC RADIATION. NOV. 16, 1971. ATR. 0302045, AUS. 0449606, BEL. 0739750, CAN. 0887022, FRA. 5934262, GRB. 1283384, ITL. 0877875, JAP. 0718339.

3,634,221.—PIGMENT RECLAIMING. JAN. 11, 1972. BEL. 0744760, CAN. 0921427, FRA. 7001822, GRB. 1301382, ITL. 0886625.

3,642,598.—PHOTOELECTROPHORETIC IMAGING METHOD AND APPARATUS. FEB. 15, 1972. ARG. 0188632, BEL. 0756481, CAN. 0922144, FRA. 7034709, GRB. 1324105, ITL. 0908073, JAP. 0740359, MEX. 0115601, VZL. 0032786.

3,645,874.—IMAGE DENSITY CONTROL IN PHOTOELECTROPHORETIC IMAGING. FEB. 29, 1972. BEL. 0756899, CAN. 0922957, FRA. 7035803, GRB. 1331621, ITL. 0908434, JAP. 0743836.

3,645,883.—PHTELCTRPHRTC IMGNG APRTUS EMPLYNG PHTSNSTV PRTCLS EXHBTG FATIGUE CHARACTERISTICS. FEB. 29, 1972.

3,647,659.—PHTELCTRPHRTC IMGNG PRCS WHEREIN IMGNG ELCTRCL FLD APPLD SUBSEQUENT TO IMAGE WISE EXPOSURE. MAR. 7, 1972. BEL. 0772912, CAN. 0958581, FRA. 7134730, GRB. 1354798, ITL. 0936734.

3,657,091.—ELECTROPHORETIC IMAGING METHOD EMPLOYING A PERIODIC ELECTRIC FIELD. APR. 18, 1972. ARG. 0174612, ATR. 0302816, AUS. 0448524, BEL. 0739752, CAN. 0913970, FRA. 6933735, GRB. 1282469, ITL. 0889439, JAP. 0709039, MEX. 0114739.

3,663,396.—KINESCOPE PHOTOELECTROPHORETIC IMAGING METHODS AND SYSTEMS. MAY 16, 1972. ARG. 0196858, BEL. 0762417, CAN. 0935965, FRA. 7104350, GRB. 1345571, ITL. 0918121, JAP. 0743838, MEX. 0131834.

3,664,941.—PHTELCTRPHRTC REVERSAL IMGNG USNG SUSPENSION CONTAINING VITAMIN PRECURSOR, B-CAROTENE. MAY 23, 1972.

3,666,472.—ELECTROPHORETIC IMAGING COMPOSITION - IMPROVEMENT OF PHAROS POLYCHROME IMAGING SYSTEM. MAY 30, 1972. ATR. 0302042, AUS. 0455711, BEL. 0739753, CAN. 0899138, FRA. 6933736, GRB. 1279284, HOL. 0147548, ITL. 0889440, JAP. 0709040, MEX. 0116450.

3,669,872.—IMAGING SYSTEM. JUNE 13, 1972.

3,676,313.—REMOVING UNDESIRED POTENTIAL FROM BLOCKING ELECTRODE IN A PHOTOELECTROPHORETIC IMAGING SYSTEM. JULY 11, 1972.

3,681,221.—PHOTOELECTROPHORETIC IMAGING BY PHOSPHORESCENCE. AUG. 1, 1972. CAN. 0935013, GRB. 1348121.

3,696,020.—ELECTROPHORETIC IMGNG APRTS INCLUDING MEANS TO COAT AND ELCTRFY IMGNG ELCTRODE. OCT. 3, 1972.

3,723,288.—ELECTROPHORETIC IMAGING APPARATUS INCLUDING MEANS TO PROJECT AN IMAGE AT A LIQUID NIP. MAR. 27, 1973.

3,737,310.—BACKGROUND REDUCTION. JUNE 5, 1973.

3,741,639.—PHOTOELECTROPHORETIC IMAGING BY PHOSPHORESCENCE. JUNE 26, 1973.

3,741,760.—IMAGING SYSTEM. JUNE 26, 1973.

3,748,035.—METHOD FOR SEQUENTIAL ILLUMINATION IN A POLYCHROME PROCESS. JULY 24, 1973. CAN. 0960288, GRB. 1416328.

3,772,013.—PHOTOEI.ECTROPHORETIC IMAGING PROCESS EMPLOYING ELECTRICALLY PHOTOSENSITIVE PARTICLES AND INERT PA. NOV. 13, 1973. ARG. 0196295, ATR. 0327682, BEL. 0777724, CAN. 0957543, FRA. 7200998, GRB. 1370026, ITL. 0946356, JAP. 0759477, MEX. 0124561, SPN. 0398586, SWD. 0367075, VZL. 30687.

3,782,932.—ELECTROPHORETIC IMAGING PROCESS USING TRANSPARENT PARTICLES. JAN. 1, 1974. ATR. 0302043, AUS. 0446066, BEL. 0743424, CAN. 0913441, FRA. 6944289, GER. 1949149, GRB. 1280900. ITL. 0897053. JAP. 0699518.

3,785,816.—ELIMINATING CORONA ARCING IN PHOTOELECTROPHORETIC IMAGING. JAN. 15, 1974.

3,787,206.—PHOTOELECTROPHORETIC IMAGING METHOD INCLUDING AT LEAST ONE ELECTRODE CARRYING A PATTERN. JAN. 22, 1974.

3,801,195 —ELECTROPHORETIC IMAGING. APR. 2, 1974. ARG. 0174613, ATR. 0293874, AUS. 0455712, BEL. 0739747, CAN. 0922141, FRA. 6933738, GER. 1949416, GRB. 1279285, HOL. 0146950, ITL. 0877873, JAP. 0709042, MEX. 0108820.

3,804,620.—METHOD OF PRODUCING PLANOGRAPHIC PLATES BY PHOTOELECTROPHORETIC IMAGING. APR. 16, 1974.

3,811,764.—APPARATUS FOR PHOTOELECTROPHORETIC IMAGING USING A PERIODIC ELECTRIC FIELD. MAY 21, 1974.

3,850,627.—ELECTROPHORETIC IMAGING METHOD. NOV. 26, 1974. BEL. 0777719, FRA. 7201005, GRB. 1376241, ITL. 0946357.

3,857,549.—PHOTOELECTROPHORETIC IMAGING APPARATUS. DEC. 31, 1974.

3,857,707.—PHOTOELECTROPHORETIC IMAGING PROCESS USING DRY PIGMENT COATED SUBSTRATE. DEC. 31, 1974.

3,881,920.—PHOTOELECTROPHORETIC IMAGING PROCESS. MAY 6, 1975.

3,905,812.—IMAGING PROCESS. SEPT. 16, 1975.

3,920,330.—ELECTROPHORETIC IMAGING APPARATUS. NOV. 18, 1975. BEL. 0777719, FRA. 7201005, GRB. 1376241, ITL. 0946357.

3,933,487.—IMAGING COMPOSITION FOR PHOTOELECTROPHORETIC IMAGING SYSTEM. JAN. 20, 1976. CAN. 0973005, GRB. 1375941.

3,954,465.—ELECTROPHORETIC IMAGING METHODS. MAY 4, 1976. BEL. 0777719, FRA. 7201005, GRB. 1376241, ITL. 0946357.

3,961,949.—PHOTOELECTROPHORETIC IMAGING METHOD PRODUCING A DESIRED IMAGE BORDER. JUNE 8, 1976.

3,967,960.—PHOTOELECTROPHORETIC IMAGING PROCESS EMPLOYING DARK CHARGE INJECTING ELEMENT. JULY 6, 1976.

Class 12O

3,647,660.—PHOTOELECTROPHORETIC IMAGING METHOD EMPLOYING A HALOGEN CONTAINING SUSPENSION. MAR. 7, 1972.

3,869,286.—PHOTOELECTROPHORETIC IMAGING WITH COPPER-FREE CHLOROPHYLL IN THE CARRIER LIQUID. MAR. 4, 1975.

Class 12P

RE.28,260.—ELECTROPHORETIC IMAGING PROCESS INCLUDING APPL OF DYNAMIC STRESS ON THE PARTICLE SUSPENSION. DEC. 3, 1974. ARG. 0174614, ATR. 0302044, AUS. 0448318, BEL. 0739748, CAN. 0890358, FRA. 6934260, GER. 1949148, GRB. 1282736, ITL. 0877874, MEX. 0108886.

3,595,772.—METHOD OF BREAKING PARTICLE AGGLOMERATES IN THE PHOTO-ELECTROPHORETIC IMAGING SYSTEM. JULY 27, 1971. ARG. 0176808, ATR. 0293875, AUS. 0445175, BEL. 0739749, CAN. 0912398, FRA. 6934261, GRB. 1290370, ITL. 0887503, JAP. 0712831, MEX. 0127747.

3,616,391.—ELECTROPHRTC IMGNG PRCSS INC APPLCTN OF DYNAMIC STRESS ON PARTCL SUSPSN-REISSUED D 2177R. OCT. 26, 1971. ARG. 0174614, ATR. 0302044, AUS. 0448318, BEL. 0739748, CAN. 0890358, FRA. 6934260, GER. 1949148, GRB. 1282736, ITL. 0877874, MEX. 0108886.

3,666,472.—ELECTROPHORETIC IMAGING COMPOSITION - IMPROVEMENT OF PHAROS POLYCHROME IMAGING SYSTEM. MAY 30, 1972. ATR. 0302042, AUS. 0455711, BEL. 0739753, CAN. 0899138, FRA. 6933736, GRB. 1279284, HOL. 0147548, ITL. 0889440, JAP. 0709040, MEX. 0116450.

3,743,404.—PHTOELECTROPHORETIC IMGNG APPTS INCNG MEANS TO SIMULTNUSLY APPLY COMPRSVE STRESS AND SHEAR TO IMGNG. JULY 3, 1973.

3,784,302.—ELECTROPHORETIC IMAGE APPARATUS INCLUDING APPLICATION OF DYNAMIC STRESS ON THE PARTICLE SUSPENS. JAN. 8, 1974.

3,833,493.—IMAGING PROCESS. SEPT. 3, 1974.

3,943,049.—APPARATUS FOR SEPARATING AGGLOMERATED PARTICLES WITH SUSPENSION. MAR. 9, 1976.

Class 12Q

3,642,364.—TRANSFER APPARATUS. FEB. 15, 1972. AUS. 0455718, BEL. 0758808, CAN. 0918412, CZC. 0164906, EGR. 0087486, FRA. 7041650, GRB. 1336720, ITL. 0909310, SPN. 0385456, STZ. 0518581, USR. 0406387.

3,655,370.—PHOTOELECTROPHORETIC IMAGE TRANSFER. APR. 11, 1972.

3,705,797.—FIXING PROCESS FOR PHOTOELECTROPHORETIC IMAGING. DEC. 12, 1972.

3,711,196.—IMAGE TRANSFER. JAN. 16, 1973.

3,791,823.—PHOTOELECTROPHORETIC IMAGING TRANSFER METHOD. FEB. 12, 1974.

3,804,508.—PHOTOELECTROPHORETIC APPARATUS FOR HEAT FACING AN IMAGE. APR. 16, 1974.

3,897,143.—IMAGING SYSTEM. JULY 29, 1975.

Class 12R

3,574,614.—PROCESS OF PREPARING MULTIPLE COPIES FROM A XEROPRINTING MASTER. APR. 13, 1971. ATR. 0305769, AUS. 0448396, BEL. 0743660, CAN. 0882599, FRA. 6944513, GRB. 1209060, ITL. 0899118, JAP. 0710908.

3,607,256.—FULLY-ENCLOSED ELECTROPHORETIC IMAGING SYSTEM. SEPT. 21, 1971.

3,682,628.—PHOTOELECTROPHORETIC FACSIMILE TRANSMISSION. AUG. 8, 1972. CAN. 0957889, GRB. 1365163.

3,800,302.—RECORDING OSCILLOGRAPH UTILIZING PHOTOELECTROPHORETIC TECHNIQUES. MAR. 26, 1974.

3,849,132.—PHOTOELECTROPHORETIC IMAGING METHOD EMPLOYING A CHROMOGENIC REACTION. NOV. 19, 1974. BEL. 0809399.

3,938,088.—CHARACTER CODING AND RECOGNITION SYSTEM. FEB. 10, 1976.

3,891,316.—MULTI-PROCESS CONTROL SYSTEM FOR AN ELECTROPHOTOGRAPHIC PRINTING MACHINE. JUNE 24, 1975.

Class 15A

3,320,060.—DEFORMATION IMAGE REPRODUCTION PROCESS UTILIZING A VOLTAGE THRESHOLD REDUCING SURFACTANT. MAY 16, 1967. CAN. 0807325, FRA. 1416119, GER. 1261867, GRB. 1097919, ITL. 0739830, JAP. 0519668.
3,338,710.—FROST THERMOGRAPHY. AUG. 29, 1967.
3,404,001.—THERMOPLASTIC DEFORMATION IMAGING WITH COLOR REAGENTS. OCT. 1, 1968. CAN. 0801265, FRA. 1459100, GRB. 1124925, ITL. 0725974, JAP. 0529727.
3,615,387.—STRIPPABLE LAYER RELIEF IMAGING PROCESS. OCT. 26, 1971. CAN. 0887033.
3,697,184.—APPARATUS FOR EVALUTING THE RECORDING CHARACTERISTICS OF A THERMOPLASTIC PHOTORECEPTOR. OCT. 10, 1972. GRB. 1389471.
3,715,207.—ELCTRSTCLY DEFORMABLE THERMOPLASTIC LAYER CONTAINING A 1,4-DIALKYLAMINO-9, 10-ANTHRAQUINONE DYE. FEB. 6, 1973.
3,729,310.—SURFACE DEFORMABLE IMAGING PROCESS AND MEMBER. APR. 24, 1973.
3,741,759.—FROST IMAGING PROCESS. JUNE 26, 1973.
3,795,514.—DEFORMATION IMAGING METHOD. MAR. 5, 1974.
3,869,612.—COPY APPARATUS WITH MEANS TO EFFECT VISIBLE RAY IMAGING AND INFRARED RAY TRANSFIXING. MAR. 4, 1975. STZ. 0032775.
3,893,416.—DEVELOPMENT AND CLEANING APP FOR REVERSE PATH MACHINE. JULY 8, 1975.
3,902,062.—REVERSE PATH IMAGING AND TRANSFIXING COPYING METHOD. AUG. 26, 1975. BEL. 0823656.
3,906,896.—INK APPLICATOR. SEPT. 23, 1975. CAN. 0974753.
3,908,125.—REVERSE PATH IMAGING AND TRANSFIXING COPYING MACHINE. SEPT. 23, 1975.
3,909,613.—COPYING METHOD AND APP WITH MEANS TO EFFECT VISIBLE RAY IMAGING AND INFRARED RAY TRANSFIXING OR FUS. SEPT. 30, 1975.
3,923,004.—DEVELOPMENT AND CLEANING APPARATUS FOR REVERSE PATH MACHINE. DEC. 2, 1975. BEL. 0823656.
3,932,025.—IMAGING SYSTEM. JAN. 13, 1976.
3,944,358.—COLOR IMAGE REPRODUCTION SYSTEMS. MAR. 16, 1976.
3,946,230.—COPY METHOD UTILIZING SINGLE RADIANT RAY PATH FOR IMAGING AND TRANSFIXING. MAR. 23, 1976.
3,949,160.—ELECTRO-OPTIC READ OUT OF THERMOPLASTIC DEFORMATION PATTERNS. APR. 6, 1976.

Class 15B

3,350,205.—METHOD OF IMAGE REPRODUCTION BY PHOTOPOLYMERIZATION AND BLUSHING. OCT. 31, 1967. CAN. 0717934, GRB. 1095174, JAP. 0561238.
3,561,962.—METHOD OF IMAGE REPRODUCTION BY PHOTOPOLYMERIZATION AND BLUSHING. FEB. 9, 1971.
3,834,906.—LIGHT ACTIVATING IMAGING PROCESS. SEPT. 10, 1974.
3,885,963.—LIGHT ACTIVATING IMAGING PROCESS. MAY 27, 1975.
3,890,147.—LIGHT ACTIVATING IMAGING PROCESS. JUNE 17, 1975.
3,892,180.—LIGHT ACTIVATING IMAGING PROCESS. JULY 1, 1975.
3,892,570.—LIGHT ACTIVATING IMAGING PROCESS. JULY 1, 1975.

Class 15B 2

3,862,841.—POLYMERIZATION IMAGING BY CHARGE INJECTION FROM A PHOTOCONDUCTIVE LAYER. JAN. 28, 1975.

Class 15C

3,250,636.—MTD AND APTS IMAGE REPRODCTN W/USE OF REUSABLE HEAT DEMAGNETIZABLE FERROMAGNETIC IMAGING LAYER. MAY 10, 1966. CAN. 0711404, GRB. 1070986, JAP. 0487336.
3,526,191.—DUPLICATING PROCESS EMPLOYING MAGNETIC DEVELOPER MATERIAL. SEPT. 1, 1970. CAN. 0903830, GRB. 1208307.

Class 15D

3,441,410.—DEFORMATION IMAGING PROCESSES USING ELECTRICALLY PHOTOSENSITIVE PHOTOCHROMIC MATERIALS. APR. 29, 1969. CAN. 0801267, FRA. 1485348, GER. 1522696, GRB. 1156151, JAP. 0545759.
3,441,411.—IMAGE FORMATION THROUGH CHEMICAL REACTION OF PHOTOCHROMIC MATER. APR. 29, 1969. CAN. 0834676, GRB. 1165215.
3,442,646.—FRMATION OF LIGHT SCATTERING IMGS IN LAYERS COMPRSNG ORGANIC PHOTOCHROMIC MATERIALS. MAY 6, 1969. GRB. 1164484.
3,450,530.—PHOTOGRAPHIC IMAGING BY MEANS THE SURFACE TENSION CREATED BY PHOTOCHROMIC MATERIALS. JUNE 17, 1969.
3,450,531.—ADHESIVE IMAGING ON PHOTOCHROMIC LAYERS. JUNE 17, 1969.
3,450,533.—FORMATION OF LIGHT SCATTERING IMAGES IN PHOTOCHROMIC LAYERS. JUNE 17, 1969. CAN. 0875500.
3,451,811.—ELECTROPHOTOGRAPHIC IMAGING PROCESSES USING ELECTRICALLY PHOTOSENSITIVE PHOTOCHROMIC MATERIALS. JUNE 24, 1969. CAN. 0828692, JAP. 0573734.
3,471,290.—PHOTOCHROMIC PHOTORESIST IMAGING. OCT. 7, 1969.
3,482,973.—IMAGING SYSTEM. DEC. 9, 1969.

Class 15E

3,635,708.—VESICULAR IMAGING PROCESS. JAN. 18, 1972.
3,847,644.—IMAGING BY PHASE AGGREGATION FROM BLOCK COPOLYMERS. NOV. 12, 1974.

Class 15F

3,396,401.—APPARATUS AND METHOD FOR MARKING OF INTELLIGENCE ON A RECORD MEDIUM. AUG. 6, 1968.
3,671,237.—METHOD FOR PRODUCING IMAGES. JUNE 20, 1972. CAN. 0886492, GRB. 1317043.
3,753,705.—AGGLOMERATION IMAGING PROCESS USING HARDENABLE MATERIAL. AUG. 21, 1973. CAN. 0929350.

Class 15N

3,901,701.—PHTOELCTRPHRETC IMGNG PROCESS USNG PHTOCNDCTVE ELECTRODE WHICH ALTERS SPECTRAL RESPONSE. AUG. 26, 1975.
3,909,609.—LIGHT SOURCE MEASURING APPARATUS. SEPT. 30, 1975.

Class 17A 1

2,774,887.—RADIATION SENSING DEVICE. DEC. 18, 1956.
3,445,660.—METHOD FOR DETECTION OF ULTRAVIOLET RADIATION. MAY 20, 1969.

Class 17A 2

3,330,700.—SOLAR-CELL PANELS. JULY 11, 1967.
3,359,137.—SOLAR CELL CONFIGURATION. DEC. 19, 1967.
3,513,040.—RADIATION RESISTANT SOLAR CELL. MAY 19, 1970.

Class 17A 3

3,351,493.—DIFFUSED RADIATION TRACKING TRANSDUCER HAVING A LATERAL PHOTO VOLTAGE JUNCTION. NOV. 7, 1967.
3,443,102.—SEMICONDUCTOR PHOTOCELL DETECTOR WITH VARIABLE SPECTRAL RESPONSE. MAY 6, 1969.

Class 17A 4

3,013,158.—LINEARIZATION OF LATERAL PHOTOCELLS. DEC. 12, 1961.
3,901,607.—HIGH APERTURE REFLECTION PHOTODETECTOR APPARATUS. AUG. 26, 1975.

Class 17B

2,021,884.—PHOTOGRAPHING APPARATUS. NOV. 26, 1935.
3,650,604.—INTER-FERAMETRIC SCANNING APPARATUS AND METHOD. MAR. 21, 1972. CAN. 0954354, GRB. 1363263.

3,650,605.—INTERFERAMETRIC APPARATUS WITH CONTROLLED SCANNING MEANS. MAR. 21, 1972. CAN. 0952749.
3,902,061.—DIGITAL OPTICAL COMPUTER TECHNIQUES. AUG. 26, 1975.

Class 17B 1

3,476,473.—FONT INDICATOR. NOV. 4, 1969.
3,481,668.—IMAGE PROJECTION APPARATUS. DEC. 2, 1969.
3,501,838.—PANTOGRAPHIC IMPLEMENTED OVERHEAD PROJECTOR. MAR. 24, 1970.
3,670,633.—RECORDING APPARATUS. JUNE 20, 1972.
3,677,148.—OPTICAL RECORDER. JULY 18, 1972.
3,678,820.—OPTICAL SYSTEM FOR PROJECTION RECORDING APPARATUS. JULY 25, 1972.
3,685,406.—OPTICAL RECORDER. AUG. 22, 1972. BEL. 0777014, CAN. 0960743, FRA. 7146254, GRB. 1372379, ITL. 0944111.
3,695,161.—ALPHANUMERIC PROJECTION DISC ASSEMBLY. OCT. 3, 1972.
3,700,325.—OPTICAL SYSTEM FOR PHOTOCOPYING APPARATUS. OCT. 24, 1972. BEL. 0764830, CAN. 0931409, FRA. 7111622, GRB. 1337447, ITL. 0922162.
3,705,543.—OPTICAL RECORDER. DEC. 12, 1972. CAN. 0948266, GRB. 1372378.
3,759,149.—MULTIPLE FLASH LAMP ALPHANUMERIC PROJECTION DISC ASSEMBLY. SEPT. 18, 1973.
3,759,612.—OPTICAL SYSTEM. SEPT. 18, 1973. BEL. 0792669, CAN. 0972193, FRA. 7243897, GRB. 1395580, ITL. 0984616.
3,768,384.—PROJECTION ASSEMBLY. OCT. 30, 1973.
3,873,207.—POLARIZING INTERFEROMETER. MAR. 25, 1975.
3,883,244.—APERTURE ADJUSTMENT IN OPTICAL ASSEMBLY. MAY 13, 1975.
3,897,136.—POLARIZATION-GRATING MOIRE. JULY 29, 1975.
3,909,103.—LENS SCAN MECHANISM. SEPT. 30, 1975.

Class 17B 2

3,355,308.—PROJECTION TRANSPARENCY HAVING A TRANSPARENT POWDER IMGE. NOV. 28, 1967.
3,476,478.—APPARATUS FOR CHANGING MAGNIFICATION OF PHOTOCOPIER W/O CHANGING CONJUGATE LENGTH OF OPTICAL SY. NOV. 4, 1969. ARG. 0172460, AUS. 0415808, BEL. 0708650, BRA. 6795668, CAN. 0845405, FRA. 1552364, GER. 1297981, GRB. 1223427. ITL. 0821929, MEX. 0100019, VZL. 0023689.
3,508,812.—HIGHLY CORRECTED SIX ELEMENT GAUSS TYPE LENS. APR. 28, 1970.
3,510,219.—OPTICAL ALIGNMENT SYSTEM. MAY 5, 1970. ARG. 0172455, BRA. 6793791, CAN. 0881018, CHL. 0023570, GRB. 1206966, MEX. 0101166, PRU. 0009329, SPN. 0360896, STZ. 0501233, SWD. 0359168, URG. 0008831, VZL. 0025783.
3,591,256.—VARIABLE MAGNIFICATION LENS SYSTEM. JULY 6, 1971. BEL. 0731553, CAN. 0881019, FRA. 6911559, GRB. 1234515, ITL. 0857660.
3,592,531.—SPLIT DAGOR-TYPE OF SYMMETRICAL COPYING LENS SYSTEM. JULY 13, 1971. CAN. 0929389.
3,600,066.—OPTICAL ASSEMBLY WITH SUPPLEMENTAL LENS MEANS. AUG. 17, 1971. CAN. 0943792, GRB. 1261159, JAP. 0728824.
3,612,662.—EYEPIECE HAVING A WIDE FIELD OF VIEW AND A LARGE EYE RELIEF. OCT. 12, 1971.
3,620,603.—OFF-CENTER FOCUSING SYSTEM. NOV. 16, 1971.
3,630,599.—MECHANICALLY COMPENSATED ZOOM LENS SYSTEM. DEC. 28, 1971. CAN. 0960891, GRB. 1363113.
3,640,605.—MECHANICALLY COMPENSATED ZOOM LENS SYSTEM. FEB. 8, 1972.
3,659,922.—SYMMETRICAL HALF-LENS OPTICAL SYSTEM. MAY 2, 1972.
3,672,748.—SPLIT DAGOR-TYPE OF SYMMETRICAL COPYING LENS SYSTEM. JUNE 27, 1972. ATR. 0322874, AUS. 0467299, BEL. 0783478, CAN. 0960495, ITL. 0955474, SPN. 0402705, STZ. 0544315, SWD. 7206274.
3,741,621.—ADD LENS PROJECTION SYSTEM WITH BALANCED PERFORMANCE. JUNE 26, 1973. BEL. 0781514, CAN. 0963300, GRB. 1393151, ITL. 0950848.
3,817,599.—PROJECTION LENS WITH ADD LENS ELEMENTS. JUNE 18, 1974.
3,865,470.—VARIABLE MAGNIFICATION LENS SYSTEM. FEB. 11, 1975. BEL. 0819497.
3,865,471.—LENS SYSTEM FOR PHOTOELECTROPHORETIC COPYING MACHINE. FEB. 11, 1975.
3,880,498.—ZOOM LENS ASSEMBLY. APR. 29, 1975.
3,907,401.—HIGH PERFORMANCE OPTICAL OBJECTIVE. SEPT. 23, 1975.
3,975,289.—CHARGE TRANSFER COMPLEXEX OF FERRONCENES HAVING LIGHT FILLING PROPERTIES. AUG. 17, 1976.

Class 17B 3

3,393,956.—UNIFORM-FIELD KERR CELL. JULY 23, 1968.
3,408,133.—KERR-CELL CAMERA SHUTTER. OCT. 29, 1968.

Class 17B 4

3,358,081.—FACSIMILE PRINTER WITH FERROELECTRIC MODULATOR. DEC. 12, 1967. CAN. 0898336, GRB. 1128973.
3,360,323.—TRANSVERSE MAGNETO-OPTICAL ROTATOR WITH COMPENSATION OF PHASE BETA RDATION. DEC. 26, 1967.
3,601,468.—OPTICAL LIGHT WAVE MODULATOR FOR REPRESENTING A FIRST COLOR LIGHT WAVE AS SECOND COLOR LIGHT WA. AUG. 24, 1971.

Class 17B 1

3,880,497.—METHOD OF STORING OPTICAL INFORMATION ON A RANDOM CARRIER. APR. 29, 1975.

Class 17B 4

3,938,881.—ACOUSTO-OPTIC MODULATION DEVICE. FEB. 17, 1976.

Class 17C

3,870,921.—IMAGE INTENSIFIER TUBE WITH IMPROVED PHOTOEMITTER SURFACE. MAR. 11, 1975.

Class 17C 1

3,277,297.—ION IMAGE TO ELECTRON IMAGE CONVERTER. OCT. 4, 1966.
3,322,999.—IMAGE-INTENSIFIER TUBE. MAY 30, 1967.
3,519,870.—SPIRLD STRIP MATRL HAVNG PRLEL GROVS FRMNG PLURALITY OF ELCTRN MULTIPLIER CHANNELS. JULY 7, 1970.

Class 17C 2

3,368,077.—INFRA-RED IMAGE INTENSIFIER HAVING A TUNNEL-EMISSION CATHODE HAVING A CONDUCTIVE MOSAIC. FEB. 6, 1968.
3,949,225.—INFRARED IMAGING APPARATUS. APR. 6, 1976.

Class 17C 3

3,446,561.—PASSIVE BRIGHT PATTERN RETICLE. MAY 27, 1969.
3,837,732.—PARTIALLY TRANSPARENT PLATED FOR INCREASED IMAGE CONTRAST. SEPT. 24, 1974. CAN. 0893234, GRB. 1237697, JAP. 0645592.

Class 17C 4

3,441,736.—IMAGE INTENSIFIER INCLUDING SEMI-CONDUCTOR AMPLIFIER LAYER. APR. 29, 1969.

Class 17D

D.235,655.—DISPLAY DEVICE. JULY 1, 1975.

Class 17D 1

3,422,737.—VARIABLE FONT CHARACTER GENERATOR. JAN. 21, 1969. ARG. 0157019, BRA. 0087922, CAN. 0788611, CHL. 0022222, FRA. 1506176, GRB. 1162840, ITL. 0788951, JAP. 0590133, MEX. 0094427.
3,519,867.—ELECTRIC DISCHARGE TUBE FOR DISPLAYING ALPHNUMERIC CHARACTER SYMBOLS. JULY 7, 1970.
3,564,319.—CATHOD RAY TUBE W/MATRIX FRMG ELEMNTL ELECTRN BEAMS AND MEANS SELECTVLY FRMG INTO CHAR AT FACE PLA. FEB. 16, 1971.

3,587,083.—CHARACTER GENERATION AND DISPLAY SYSTEM. JUNE 22, 1971. CAN. 0858092, FRA. 1582728, GER. 1774884, GRB. 1234580, ITL. 0846528, JAP. 0678504.
3,641,557.—CIRCUIT ARRANGEMENT FOR AN ELECTRIC DISCHARGE TUBE. FEB. 8, 1972.
3,742,484.—CHARACTER GENERATING APPARATUS EMPLOYING BIT STEAM LENGTH CORRECTION. JUNE 26, 1973.
3,781,848.—DISPLAY SYSTEM - CHARACTER GENERATOR SYSTEM A. DEC. 25, 1973.
3,810,165.—ELECTRONIC DISPLAY DEVICE. MAY 7, 1974.
3,830,646.—IMAGE REGISTRATION CORRECTION FOR NON-IMPACT PRINTERS. AUG. 20, 1974. CAN. 0986764, FRA. 7339099.
3,911,419.—CONTROLLER FOR CURSOR POSITIONING ON A DISPLAY MEDIUM. OCT. 7, 1975.

Class 17D 2

RE.28,360.—ELECTROPHORETIC COLOR DISPLAY DEVICE. MAR. 4, 1975.
3,524,022.—ELECTRO-OPTICAL DISPLAY SYSTEM. AUG. 11, 1970.
3,588,584.—APPARATUS FOR POSITIONING A LIGHT SPOT ONTO A CHARACTER MASK. JUNE 28, 1971.
3,612,758.—COLOR DISPLAY DEVICE - REISSUED D 2717R. OCT. 12, 1971.

Class 17D 3

3,198,976.—ELECTRIC DISCHARGE TUBES AND APPLICATIONS THEREOF. AUG. 3, 1965.
3,264,638.—ELECTRONIC CODE TRANSLATION. AUG. 2, 1966. CAN. 0740559.
3,349,677.—ALPHA NUMERIC CHARACTER PRINTER. OCT. 31, 1967.
3,403,390.—MESSAGE STORAGE. SEPT. 24, 1968. GRB. 1078401.
3,861,804.—INFEROMETRY READOUT OF PHASE INFORMATION. JAN. 21, 1975. CAN. 0980745, GRB. 1387905.
3,898,377.—VIDEO MIXER. AUG. 5, 1975.

Class 17D 4

3,478,659.—APPARATUS FOR JUSTIFYING A REPRODUCED LINE OF CHARACTERS. NOV. 18, 1969.

Class 17D 5

3,330,190.—PRINTING APPARATUS. JULY 11, 1967. CAN. 0758791, GER. 1280282, GRB. 1102419, JAP. 0529726.

Class 17E

3,852,775.—MOVING BELT SCANNING PRINTER. DEC. 3, 1974.

Class 17E 1

3,337,718.—LIGHT SCAN RECORDING AND READOUT. AUG. 22, 1967. CAN. 0794443, GRB. 1070030.
3,426,144.—TRANSCEIVER APPARATUS FOR TRANSMITTING AND RECORDING OPTICAL INFORMATION. FEB. 4, 1969. CAN. 0810757, GRB. 1158568, JAP. 0579399.
3,426,354.—ELECTROSTATIC CHARGE IMAGE RECORDER. FEB. 4, 1969. AUS. 0295167, BEL. 0664729, CAN. 0739120, DNK. 0115269, FRA. 1455131, GER. 1280281, GRB. 1084494, HOL. 0136720, ITL. 0761085, JAP. 0492014, STZ. 0444906, SWD. 0338117.
3,548,195.—RADIATION SENSITIVE DOCUMENT SCANNING MEANS. DEC. 15, 1970. CAN. 0901968, FRA. 1592840, GER. 1809854, GRB. 1230836, ITL. 0848026, JAP. 0587941.
3,553,463.—RADIATION SENSITIVE DOCUMENT SCANNING APPARATUS USING HELICAL SCANNER. JAN. 5, 1971.
3,775,559.—APERTURE DESIGNS FOR FACSIMILE SCANNING APPARATUS. NOV. 27, 1973. CAN. 0960770, GRB. 1376189.
3,820,900.—INSTRUMENT FOR SCANNING DOCUMENT FOR QUALITY. JUNE 28, 1974.
3,867,571.—FLYING SPOT SCANNER. FEB. 18, 1975.
3,898,470.—SCANNING ARRANGEMENT FOR MULTIFUNCTION OPERATION. AUG. 5, 1975.
3,922,485.—FLYING SPOT SCANNER WITH SCAN DETECTION. NOV. 25, 1975.
3,944,323.—VARIABLE SPOT SIZE SCANNING. MAR. 16, 1976. BEL. 0835552.
3,946,150.—OPTICAL SCANNER. MAR. 23, 1976.
3,966,319.—FLAT FIELD SCREENING MIRROR. JUNE 29, 1976.
3,970,359.—FLYING SPOT FLAT FIELD SCANNER. JULY 20, 1976.
3,973,825.—FLAT FIELD SCANNING SYSTEM. AUG. 10, 1976. BEL. 0836735.

Class 17E 2

3,407,329.—SCANNED CONVERSION TUBE. OCT. 22, 1968. CAN. 0836783, GER. 1639461, GRB. 1190967, JAP. 0565840.
3,437,408.—MULTIPLE COPY ELECTROSTATIC IMAGING APPARATUS. APR. 8, 1969. ARG. 0164840, ATR. 0283115, AUS. 0410817, BEL. 0704323, CAN. 0831674, CZC. 0156411, EGR. 0065587, FRA. 1538197, GRB. 1202583, HUN. 0161168, ITL. 0822157, JAP. 0582502, MEX. 0099950, SPN. 0345482, STZ. 0484459, SWD. 0331795, USR. 0353450, VZL. 0023662.
3,474,417.—FIELD EFFECT SOLID STATE IMAGE PICKUP AND STORAGE DEVICE. OCT. 21, 1969. CAN. 0869188, GER. 1549144, GRB. 1203095, JAP. 0568732.
3,523,188.—SEMICONDUCTOR CURRENT CONTROL DEVICE AND METHOD. AUG. 4, 1970.

Class 17E 3

3,485,945.—ELECTRONIC LENTICULAR RECORDING SYSTEM. DEC. 23, 1969.
3,510,570.—ELECTRONIC LENTICULAR DISPLAY SYS. MAY 5, 1970.
3,650,621.—OPTICAL IMAGING SYSTEM. MAR. 21, 1972. BEL. 0747978, CAN. 0927470, FRA. 7011548, GRB. 1297907, ITL. 0898936, JAP. 0731225.
3,655,284.—LONGITUDINALLY INSENSITIVE LENS STRIP IMAGING DEVICE. APR. 11, 1972.
3,827,062.—OPTICAL ARRANGEMENT FOR HIGH SPEED PRINTOUT SYSTEM. JULY 30, 1974.
3,853,387.—VARIABLE MAGNIFICATION LENS ASSEMBLY HAVING TWO ADD LENSES. DEC. 10, 1974.
3,865,470.—VARIABLE MAGNIFICATION LENS SYSTEM. FEB. 11, 1975. BEL. 0819497.

Class 17E 4

3,279,342.—COMMUNICATION PRINTER. OCT. 18, 1966. CAN. 0767902, GRB. 1120446, JAP. 0698291.
3,481,668.—IMAGE PROJECTION APPARATUS. DEC. 2, 1969.
3,485,546.—FIELD FLATTENER SCANNING MEANS. DEC. 23, 1969. CAN. 0850916, GRB. 1196373, JAP. 0667705.
3,504,960.—SAGITTAL RAY APERTURE STOP. APR. 7, 1970. AUS. 0413558, BEL. 0704924, CAN. 0849815, FRA. 1540700, GRB. 1209472, ITL. 0814606, JAP. 0972613.
3,532,425.—GRAPHIC DISTORTION APPARATUS. OCT. 6, 1970.
3,544,190.—LENS STRIP OPTICAL SCANNING SYSTEM. DEC. 1, 1970. CAN. 0904070, GRB. 1278336.
3,584,950.—LENS STRIP OPTICAL SCANNING SYSTEM. JUNE 15, 1971.
3,584,952.—LENS STRIP OPTICAL SCANNING SYSTEM - REISSUED D 2074R. JUNE 15, 1971.
3,584,953.—SHORT FOCAL OPTICAL LENGTH SCANNING SYSTEM. JUNE 15, 1971.
3,963,343.—CAMMING SYSTEMS. JUNE 15, 1976. BEL. 0824049.

Class 17E 5

3,155,022.—BUFFER FOR ELECTRONIC DISPLAY READOUT. NOV. 3, 1964. CAN. 0773751, GRB. 1056114, JAP. 0542586.
3,219,993.—IMAGE FORMATION AND DISPLAY UTILIZING A THERMOTROPICALLY COLOR REVERSIBLE MATERIAL. NOV. 23, 1965. CAN. 0762159, JAP. 0474129.
3,249,757.—THERMAL IMAGING DEVICE. MAY 3, 1966.

Class 17E 6

3,456,074.—IMAGE STABILIZATION OF OPTICAL IMAGING SYSTEMS. JULY 15, 1969.
3,461,227.—MECHANICAL JITTER EQUALIZER. AUG. 12, 1969. CAN. 0824819, GRB. 1198303.
3,873,189.—ADJUSTABLE-POSITION OPTICAL SYSTEM. MAR. 25, 1975.

Class 17E 1

3,962,538.—FLYING SPOT SCANNING SYSTEM WITH VISUAL SCANNERS. JUNE 8, 1976.

Class 17F 1

3,325,674.—MOVING TARGET DISPLAY INDICATOR. JUNE 13, 1967.
3,340,419.—ELECTRIC DISCHARGE TUBES. SEPT. 5, 1967. CAN. 0773690.
3,447,026.—CRT SCAN STABILIZER. MAY 27, 1969.
3,483,414.—STORG TUBE HVG FLD EFF LAYR W/ CONDCTG PINS EXT TO LAYR THAT READOUT NOT ERASE CHG PATTERN. DEC. 9, 1969. CAN. 0850846, GER. 1537566, GRB. 1203432, JAP. 0565841.

Class 17F 2

3,153,785.—TIME COMPRESSED DISPLAY. OCT. 20, 1964. CAN. 0708306, GRB. 1008993.
3,579,024.—SELECTIVE BLANKING CONTROL CIRCUIT. MAY 18, 1971.

Class 17G

3,619,714.—PANEL DISPLAY DEVICE. NOV. 9, 1971.

Class 17G 1

3,459,946.—SOLID STATE STORAGE DEVICE. AUG. 5, 1969.
3,510,660.—METHOD FOR VISUAL COMPARISON OF INFORMATION. MAY 5, 1970. CAN. 0848611, GRB. 1201376, JAP. 0595641.
3,539,862.—DUAL CONDUCTOR STORAGE PANEL. NOV. 10, 1970. ARG. 0175067, AUS. 0414034, BEL. 0723721, CAN. 0878168, FRA. 1591040, GER. 1808238, GRB. 1235310, ITL. 0847618, JAP. 0742515, MEX. 0111871, SPN. 0360366, STZ. 0493930, SWD. 0345341, VZL. 0023718.

Class 17G 2

3,531,647.—DEVICE AND PROCESS FOR REDUCTION OF BACKGROUND LIGHT IN SOLID STATE STORAGE PANELS. SEPT. 29, 1970. CAN. 0862333, FRA. 1540063, GER. 1549143, GRB. 1201375, ITL. 0818126, MEX. 0101197.
3,531,648.—SOLID STATE STORAGE PANEL FOR COLOR REPRODUCTION. SEPT. 29, 1970. CAN. 0846433, GRB. 1201377.
3,540,008.—SOLID STATE STORAGE DEVICES HAVING NON-CORONA EXTINCTION CAPABILITY. NOV. 10, 1970. ARG. 0166245, AUS. 0424286, BEL. 0725616, CAN. 0897827, FRA. 1599275, GER. 1815243, GRB. 1250023, ITL. 0849327, JAP. 0742516, MEX. 0106020, SPN. 0361652, STZ. 0504755, SWD. 0361123, VZL. 0023729.
3,561,964.—METHOD FOR PRODUCTION OF SOLID STATE STORAGE PANELS. FEB. 9, 1971. ARG. 0184633, AUS. 0427883, BEL. 0736077, CAN. 0866994, FRA. 6924001, GER. 1935763, GRB. 1270845, ITL. 0870080, JAP. 0681942, MEX. 0113574, SPN. 0369656, STZ. 0513430, SWD. 0358991, VZL. 0023743.
3,594,610.—DISPLAY PANEL WITH CORONA DISCHARGE CONTROL. JULY 20, 1971.

Class 17G 3

3,154,636.—THREE DIMENSIONAL DISPLAY DEVICE. OCT. 27, 1964. CAN. 0794989, GRB. 1029611, JAP. 0462394.
3,205,403.—ELECTROLUMINESCENT DISPLAY SYSTEMS. SEPT. 7, 1965.
3,221,335.—ELECTRO-OPTICAL. RECORDING AND VISUAL DISPLAY SYSTEMS. NOV. 30, 1965. AUS. 0226551, CAN. 0801882, FRA. 1202340, GER. 1107705, GRB. 0880692, JAP. 0306714.

Class 17G 4

3,293,441.—IMAGE INTENSIFIER WITH FERRO-ELECTRIC LAYER AND BALANCED IMPEDANCES. DEC. 20, 1966.
3,300,645.—FERROELECTRIC IMAGE INTENSIFIER INCLUDING INVERSE FEEDBACK MEANS. JAN. 24, 1967.
3,440,428.—IMAGE CONVERTER USING CHARGED PHOTOEMISSIVE LAYER. APR. 22, 1969. CAN. 0858119, GER. 1639462, GRB. 1202049, JAP. 0565839.
3,441,736.—IMAGE INTENSIFIER INCLUDING SEMI-CONDUCTOR AMPLIFIER LAYER. APR. 29, 1969.
3,531,646.—ENHANCEMENT OF ELECTROSTATIC IMAGES. SEPT. 29, 1970. CAN. 0892186, GRB. 1199462, JAP. 0641476.
3,543,032.—DEVICE AND PROCESS FOR AMPLIFYING AND STORING AN IMAGE. NOV. 24, 1970. ARG. 0177440, CAN. 0880586, MEX. 0111518, PNM. 0001809, VZL. 0027508.

Class 17H

3,742,281.—CONTROLLED SPECTRUM FLASH LAMP. JUNE 26, 1973.

Class 17H 1

3,427,564.—HIGH-POWER IONIZED GAS LASER STRUCTURE. FEB. 11, 1969.
3,437,950.—ION LASER HAVING A METAL TUBE SHRINK-FITTED ONTO THE CERAMIC DISCHARGE TUBE. APR. 8, 1969.
3,523,256.—HEAT PUMPED LASER. AUG. 4, 1970.
3,529,261.—LASR HVNG ACTV MEDIUM WHCH IS AN EXCTD HALOGN WHSE LOWR ENRGY ST IS DEPLETD BY REACTNG W/ALKAL. SEPT. 15, 1970. CAN. 0816276, FRA. 1446601, GER. 1299367, GRB. 1124346, ITL. 0726918.
3,562,173.—LASER MATERIALS. FEB. 9, 1971.
3,860,888.—TIME-SHARING TWO FREQUENCY LASER. JAN. 14, 1975.
3,954,534.—LIGHT EMITTING DIODE ARRAY WITH DOME GEOMETRY. MAY 4, 1976.
3,969,686.—BEAM COLUMNATION USING MULTIPLE COUPLED ELEMENTS. JULY 13, 1976.

Class 17H 2

3,296,541.—BROADBND TRVLNG WAVE MASER W/BOTH MASER AND ISOLATOR CRYSTALS CUT ATDFRNT ANGLES TO OPTICAL AXIS. JAN. 3, 1967.

Class 17H 3

3,258,597.—LASER HETERODYNE COMMUNICATION SYSTEM. JUNE 28, 1966.
3,465,166.—FAR INFRA-RED COHERENT LIGHT GENERATOR. SEPT. 2, 1969.
3,499,159.—POLYCHROMATIC LASER AEROSOL SIZING AND RANGING-PLASAR-TECHNIQUE. MAR. 3, 1970.
3,500,236.—LASER STABILIZING SYSTEM. MAR. 10, 1970.
3,534,289.—LASER SYSTEM WITH OPTICAL DISCRIMINATOR. OCT. 13, 1970.
3,753,144.—GAS LASER STRUCTURE. AUG. 14, 1973.
3,909,254.—LASER RECORDING METHOD. SEPT. 30, 1975.

Class 17I

3,630,598.—OPTICAL DEMODULATION FILTER. DEC. 28, 1971. BEL. 0761134, CAN. 0904628, GRB. 1330709, ITL. 0914073, JAP. 0770139.
3,650,605.—INTERFERAMETRIC APPARATUS WITH CONTROLLED SCANNING MEANS. MAR. 21, 1972. CAN. 0952749.
3,687,535.—OPTICAL DEMODULATION SYSTEM. AUG. 29, 1972. BEL. 0762859, CAN. 0944075, FRA. 7105649, GRB. 1343483, ITL. 0918450.
3,689,267.—SCREEN MAKING PROCESS UTILIZING ROTATION OF OPTICAL PLATE. SEPT. 5, 1972. CAN. 0950736.
3,697,184.—APPARATUS FOR EVALUATING THE RECORDING CHARACTERISTICS OF A THERMOPLASTIC PHOTORECEPTOR. OCT. 10, 1972. GRB. 1389471.
3,776,995.—METHOD OF PRODUCING X-RAY DIFFRACTION GRATING. DEC. 4, 1973. CAN. 0944871, GRB. 1363262.

Class 17I 1

3,191,440.—PRESSURE GAUGE INSTRUMENT. JUNE 29, 1965.
3,249,760.—PRESSURE GAUGE INSTRUMENT. MAY 3, 1966.

Class 17I 2

3,416,865.—OPTICAL DENSITY MEASURING SYSTEM. DEC. 17, 1968.

3,609,047.—SINGLE BEAM PHOTOMETER SYSTEM WHEREIN THE ABSORBANCE OF A SAMPLE IS DETERMINED RELATIVE TO REFE. SEPT. 28, 1971.

Class 171 3

3,560,085.—APPARATUS FOR GRAPHIC DISTORATION. FEB. 2, 1971.
3,697,063.—DOCUMENT HANDLING APPARATUS. OCT. 10, 1972. GRB. 1369618.

Class 17J

D.236,733.—CURSOR POSITION CONTROLLER. SEPT. 9, 1975.
3,447,030.—COLD SEAL LAMP PRESSURE REGULATION. MAY 27, 1969.
3,642,377.—COLOR PRINTING SYSTEM. FEB. 15, 1972.
3,733,123.—METHOD AND APPARATUS FOR ENCLOSING A LAMP. MAY 15, 1973. ARG. 0198292, AUS. 0466394, BEL. 0789338, FRA. 7234198, GRB. 1410046, ITL. 0967625, MEX. 0128585, SPN. 0409972, STZ. 0549825, SWD. 0360935.
3,775,006.—APPARATUS FOR OPTICAL COLOR SEPARATION. NOV. 27, 1973.
3,795,805.—APPARATUS FOR TESTING A CREDIT CARD. MAR. 5, 1974.
3,873,813.—CREDIT CARD. MAR. 25, 1975.
3,892,963.—TRANSDUCER FOR A DISPLAY-ORIENTED POINTING DEVICE. JULY 1, 1975.
3,936,179.—SUPPORT STRUCTURE FOR A DUPLICATOR OPTICAL SYSTEM. FEB. 3, 1976.

Class 18

2,578,677.—METHOD OF MAKING PHOTOGRAPHIC SENSITIZING DYES. DEC. 18, 1951.
3,736,133.—TRANSPARENT INK - ABSORBENT LAQUERS. MAY 29, 1973. ARG. 0193996, CAN. 0985583. GRB. 1390137, MEX. 0127276.
3,738,832.—COLOR ELECTROPHOTOGRAPHIC PROCESS EMPLOYING LIQUID DEVELOPER CONTAINING GELATINAIN. JUNE 12, 1973.
3,860,484.—ENZYME STABILIZATION. JAN. 14, 1975.

Class 18A

2,653,152.—CYANINE DYE AND PROCESS OF MAKING SAME. SEPT. 22, 1953.
3,238,150.—PHOTOCONDUCTIVE CADMIUM SULFIDE POWDER AND METHOD FOR THE PREPARATION THEREOF. MAR. 1, 1966. CAN. 0712516, GRB. 1062022, JAP. 0486530.
3,402,177.—SUBSTITUTED 1-CYANO-2,3-PHTHALOYL-7,8-BENZOPYRPOCOLINES. SEPT. 17, 1968. AUS. 0435189, BEL. 0743896, CAN. 0812820, GRB. 1145373.
3,471,290.—PHOTOCHROMIC PHOTORESIST IMAGING. OCT. 7, 1969.
3,478,064.—1,5-BIS-SUBSTITUTED ALKYLAMINOANTHRAQUINONES. NOV. 11, 1969. ARG. 0145636, AUS. 0419687, BEL. 0683222, CAN. 0880309, FRA. 1484968, GRB. 1155986, ITL. 0771955, JAP. 0581828, MEX. 0092775, SPN. 0328428, STZ. 0461273, SWD. 0328188, VZL. 0021224.
3,482,973.—IMAGING SYSTEM. DEC. 9, 1969.
3,485,633.—ELECTROPHORETIC IMG PROC EMPL METALLIC LAKES OF FLUCRESCEIN DERIVATIVES AS ELECTRICLY PHOTOSENS. DEC. 23, 1969. AUS. 0444394, BEL. 0743641, CAN. 0848386, GRB. 1190965. JAP. 0586923.
3,562,248.—BISAZC FGMTS DRVD CPLRS CBTC CONDG 8-AMINO-2-NAPHTHOLS W/ DICARBOXYLIC ACID CHLORIDES. FEB. 9, 1971. ATR. 0302037, AUS. 0435392, BEL. 0743422, CAN. 0889836, FRA. 6944290, GER. 1717183, GRB. 1217905, ITL. 0879047, JAP. 0608727.
3,667,943.—QUINACRIDONE PIGMENTS IN ELECTROPHOTOGRAPHIC IMAGING. JUNE 6, 1972. ARG. 0184823, AUS. 0452663, BEL. 0737810, CAN. 0877882, EGR. 0077411, FRA. 6928700, GRB. 1278702, ITL. 0888005, SPN. 0370720, STZ. 0519183, SWD. 0346396, TIW. 0005517, USR. 0351396.
3,667,944.—QUINACRIDONE PIGMENTS IN ELECTROPHOTOGRAPHIC RECORDING. JUNE 6, 1972. ARG. 0177369, AUS. 0452031, BEL. 0741159, CAN. 0884807, FRA. 6937223, GRB. 1286079, ITL. 0879710, JAP. 0693421, MEX. 0115407.
3,667,945.—QUINACRIDONE PIGMENTS IN ELECTROPHOTOGRAPHIC IMAGING. JUNE 6, 1972.
3,671,467.—SELENIUM CONTAINING POLYMERS. JUNE 20, 1972. ARG. 0190619, BEL. 0770689, CAN. 0941544, FRA. 7128500, GRB. 1364297, ITL. 9308410, SPN. 0393651, VZL. 0029342.
3,694,201.—METHOD FOR PHOTOCONDUCTIVE POWDER. SEPT. 26, 1972. BEL. 0777717, CAN. 0982808, FRA. 7201003, GRB. 1381162, ITL. 0946352.
3,708,292.—PI-FORM METAL PHTHALOCYANINE. JAN. 2, 1973. ARG. 0194234, BEL. 0783793, GRB. 1396922, ITL. 0955644, MEX. 0128928.
3,708,293.—PI-FORM METAL-FREE PHTHALOCYANINE. JAN. 2, 1973. ARG. 0195167, BEL. 0783792, GRB. 1395769, ITL. 0955643, MEX. 0131970.
3,837,850.—PHOTOCONDUCTIVE BUTILE TITANIUM DIOXIDE. SEPT. 24, 1974.
3,867,145.—METHANOL AND HEAT TREATED ZINC OXIDE. FEB. 18, 1975.
3,905,958.—SELENIUM COMPOUNDS. SEPT. 16, 1975.
3,965,049.—ONE-STEP SYNTHESIS OF AROMATIC ORGANIC DISELENIDES. JUNE 22, 1976.

Class 18A 3

3,448,028.—N-SBSTUD-8,13-DIOXODINAPHTHO-2-1-B,2,3-D-FURAN-6-CARBOXAMIDES AS ELCTLY PTOSNSTV MTLS IN ELCPHG. JUNE 3, 1969.

Class 18A 1

3,384,488.—POLYCHROMATIC PHOTOELECTROPHORETIC IMAGING COMPOSITION. MAY 21, 1968.
3,447,922.—ELECTRICALLY PHOTOSENSITIVE PARTICLES USEFUL IN PHOTOELECTROPHORETIC AND XEROGRAPHIC IMAGING PROC. JUNE 3, 1969.
3,448,028.—N-SBSTUD-8,13-DIOXODINAPHTHO-2-1-B,2,3-D-FURAN-6-CARBOXAMIDES AS ELCTLY PTOSNSTV MITS IN ELCPHG. JUNE 3, 1969.
3,531,309.—COMPOSITIONS COMPRISING 1-CYANO-2,3-PHTHALOYL-7,8-BENZOPYRROCOLINES AND A CARRIER. SEPT. 29, 1970.
3,546,085.—PHOTOELECTROPHORETIC IMAGING PROCESS AND SUSPENSION. DEC. 8, 1970. BEL. 0710052, CAN. 0875493, FRA. 1568088, GRB. 1208812, ITL. 0823929, JAP. 0594741.

Class 18A 2

3,492,308.—PROCESS FOR PREPARING METAL FREE PHTHALOCYANINES - SYNTHESIS OF METAL-FREE PHTHALOCYANINE. JAN. 27, 1970. CAN. 0922708, GRB. 1216887, JAP. 0586926.
3,492,309.—SYNTHESIS OF ALPHA METAL-FREE PHTHALOCYANINE. JAN. 27, 1970. CAN. 0894803, GRB. 1206306, JAP. 0604155.
3,509,146.—PROCESS OF PREPARING PHTHALOCYANINE AND HETEROCYCLIC ANALOGUES. APR. 28, 1970. CAN. 0865117, GRB. 1232241, JAP. 0587395.
3,672,979.—METHOD OF PRODUCING A PHTHALOCYANINE PHOTOCONDUCTIVE LAYER. JUNE 27, 1972. ARG. 0184673, AUS. 0457271, BEL. 0761135, CAN. 0951697, FRA. 7047702, GRB. 1334060, ITL. 0914074, JAP. 0753795, MEX. 0119529, PNM. 0002191, SPN. 0386759, STZ. 0571731, TIW. 0007180, VZL. 0032789.
3,761,261.—PHTHALOCYANINE DYE SENSITIZERS FOR ZINC OXIDE. SEPT. 25, 1973.

Class 18A 2A

RE.27,117.—METAL FREE PHTHALOCYANINE IN THE NEW X-FORM-RE OF 3,357,989-D1170. APR. 20, 1971.
3,594,163.—METHOD OF CONVERTING ALPHA PHTHALOCYANINE TO THE X FORM. JULY 20, 1971.
3,657,272.—PROCESS FOR PREPARING X-FORM METAL FREE PHTHALOCYANINE. APR. 18, 1972.
3,816,118.—ELECTROPHOTOGRAPHIC ELEMENT CONTAINING PHTHALOCYANINE. JUNE 11, 1974. ARG. 0156316, CAN. 0890855, FRA. 0091579, GRB. 1175451, ITL. 0809972, MEX. 0115884, VZL. 0024012.
3,862,127.—PROCESS. JAN. 21, 1975. AUS. 0453518, BEL. 0754407, FRA. 7028418, GRB. 1268574, ITL. 0929169, JAP. 0727963, SPN. 0382366.
3,903,107.—DIRECT ALPHA TO X PHASE CONVERSION OF METAL CONTAINING PHTHALOCYANINE. SEPT. 2, 1975. BEL. 0815632, SAF. 0743536.
3,927,026.—PROCESS OF MAKING X-FORM METAL PHTHALOCYANINE. DEC. 16, 1975. CAN. 0916703, GRB. 1312946, JAP. 0693981.

3,932,180.—DIRECT ALPHA TO X PHASE CONVERSION OF METAL-FREE PHTHALOCYANINE. JAN. 13, 1976. BEL. 0815632, SAF. 0743536.
3,932,454.—PROCESS OF MAKING HEXAGONAL ALPHA METAL-FREE PHTHALOCYANINE. JAN. 13, 1976. CAN. 0918152, GRB. 1327084, JAP. 0752724.

Class 18A 3

3,447,922.—ELECTRICALLY PHOTOSENSITIVE PARTICLES USEFUL IN PHOTOELECTROPHORETIC AND XEROGRAPHIC IMAGING PROC. JUNE 3, 1969.

Class 18A 4

3,384,632.—ARYLAZO-4-ISOPROPOXY-1-NAPHTHOL COMPOUNDS. MAY 21, 1968. BEL. 0743897, CAN. 0787920, FRA. 1473703, GER. 1644400, GRB. 1145374, ITL. 0764015, JAP. 0578398.
3,574,182.—CALCIUM SALT OF 6-BROMO-1-1-SULFO-2-NAPHTHYLAZO-2-NAPHTHOL. APR. 6, 1971. ARG. 0168131, ATR. 0302812, AUS. 0429649, BEL. 0710053, CAN. 0878483, CHL. 0024254, CLB. 0018785, DNK. 0128493, FIN. 0049711, FRA. 1556484, GRB. 1197374, GRK. 0036648, IND. 0114221, ISR. 0029376, ITL. 0823989, JAP. 0605213, LXB. 0055364, MEX. 0099564, NOR. 0129593, NZL. 0151403, PRU. 0009483, PTG. 0049036, SAF. 0068559, SPN. 0349965, STZ. 0524844, SWD. 0351737, URG. 0008893, VZL. 0032776.

Class 18B

3,467,634.—ORGANOSILICON TERPOLYMERS AND PROCESS. SEPT. 16, 1969. ARG. 0165758, AUS. 0417109, BEL. 0702403, CAN. 0857389, FRA. 1534183, GRB. 1200756, HOL. 0826202, ITL. 0826202, JAP. 0671041, MEX. 0100136, NOR. 0125392, SPN. 0343902, STZ. 0484210, SWD. 0339752, VZL. 0025437.
3,671,467.—SELENIUM CONTAINING POLYMERS. JUNE 20, 1972. ARG. 0190619, BEL. 0770689, CAN. 0941544, FRA. 7128500, GRB. 1364297, ITL. 9308410, SPN. 0393651, VZL. 0029342.
3,725,505.—PYRENE CONTAINING POLYMERS PREPARED BY ANIONIC POLYMERIZATION. APR. 3, 1973. ARG. 0183776, AUS. 0459733, BEL. 0770501, CAN. 0986650, FRA. 7127963, GRB. 1359045, ITL. 0930707, MEX. 0120152, SPN. 0393582, VZL. 0031959.
3,776,760.—METHOD FOR MANUFACTURING A TETRAFLUOROETHLENE POLYMER-COATED ROLL. DEC. 4, 1973. ARG. 0199302, AUS. 0165141, BEL. 0789728, CAN. 0990149, GRB. 1410025, NZL. 0168554, SAF. 0727133, STZ. 0028514.
3,852,861.—SURFACES WITH FLUOROCARBON PROCESS FOR MULTIPLE COATING RESINS. DEC. 10, 1974. ARG. 0199302, AUS. 0165141, BEL. 0789728, CAN. 0990149, GRB. 1410025, NZL. 0168554, SAF. 0727133, STZ. 0028514.
3,860,484.—ENZYME STABILIZATION. JAN. 14, 1975.
3,864,144.—PROCESS FOR PREPARATION OF PHOTOCONDUCTIVE FILMS FROM INTRACTABLE MATERIALS. FEB. 4, 1975. GRB. 1414158, TIW. 0008534.
3,877,936.—PHOTOCONDUCTIVE COPOLYMER OF N-VINYLCARBAZOLE AND N-VINYLPHTHALIMIDE. APR. 15, 1975. BEL. 0812436.
3,879,198.—ELECTROPHOTOGRAPHIC AMBIPOLAR PHOTOCONDUCTIVE COMPOSITION AND IMAGING METHOD. APR. 22, 1975.
3,882,087.—ORGANIC PHOTOCONDUCTIVE MATERIAL. MAY 6, 1975.
3,883,488.—2-VINYL-9-DICYANOMETHYLENE-FLUORENE AND DERIVATIVES THEREOF. MAY 13, 1975.
3,884,825.—IMAGING COMPOSITION. MAY 20, 1975. AUS. 0467835, BEL. 0802879, GRB. 1437041.
3,895,945.—PROCESS FOR PREPARATION OF A DYESTUFF SENSITIZED PHOTOCONDUCTIVE COMPOSITION. JULY 22, 1975.
3,899,328.—ACTIVE MATRIX AND INTRINSIC PHOTOCONDUCTIVE POLYMER OF A LINEAR POLYSILOXANE. AUG. 12, 1975.
3,943,108.—PHOTOCONDUCTIVE COMPOSITION OF AN ALDEHYDE CONDENSATE. MAR. 9, 1976.
3,951,658.—COLOR MODIFYING IMAGING METHOD AND ARTICLE. APR. 20, 1976.
3,954,906.—AMBIPOLAR PHOTOCONDUCTIVE COMPOSITION AND IMAGING METHOD. MAY 4, 1976.
3,965,049.—ONE-STEP SYNTHESIS OF AROMATIC ORGANIC DISELENIDES. JUNE 22, 1976.
3,970,602.—COPOLYMERS OF N-VINYLCARBAZOLE AND N-VINYLPHTHALIMIDE AND DERIVATIVES THEREOF. JULY 20, 1976. BEL. 0812436.

Class 18C 1

3,884,825.—IMAGING COMPOSITION. MAY 20, 1975. AUS. 0467835. BEL. 0802879, GRB. 1437041.

Class 18C 1A

2,919,247.—TRIPARTITE DEVELOPER FOR ELECTROSTATIC IMAGES. DEC. 29, 1959. CAN. 0565006.
2,965,573.—XEROGRAPHIC DEVELOPER. DEC. 20, 1960. CAN. 0612918, GRB. 0934406.
3,720,617.—AN ELECTROSTATIC DEVELOPER CONTAINING MODIFIED SILICON DIOXIDE PARTICLES. MAR. 13, 1973. ARG. 0189666, ATR. 0321104, AUS. 0463862, BEL. 0767359, CAN. 0941212, CHL. 0026780, EGR. 0093928, FRA. 7118950, GRB. 1347318, ITL. 0926884, MEX. 0131403, NZL. 0163670, PNM. 0002393, PRU. 0011824, STZ. 0567746, SWD. 0366402, TIW. 0006149, USR. 0460634, VZL. 0032423.
3,819,367.—IMAGING SYSTEM. JUNE 25, 1974. ARG. 0189666, ATR. 0321104, AUS. 0463862, BEL. 0767359, CAN. 0941212, CHL. 0026780, EGR. 0093928, FRA. 7118950, GRB. 1347318, ITL. 0926884, MEX. 0131403, NZL. 0163670, PNM. 0002393, PRU. 0011824, STZ. 0567746, SWD. 0366402, TIW. 0006149. USR. 0460634, VZL. 0032423.
3,820,986.—LIQUID DEVELOPMENT METHOD AND MATERIALS. JUNE 28, 1974.
3,833,364.—METHOD OF DEVELOPING ELECTROSTATIC IMAGE CHARGE. SEPT. 3, 1974.
3,850,830.—LIQUID DEVELOPER CONTAINING EXTENDER BODY PARTICLES. NOV. 26, 1974.
3,900,588.—NON-FILMING DUAL ADDITIVE DEVELOPER. AUG. 19, 1975. BEL. 0825924.

Class 18C 1B

3,013,890.—PROCESS OF DEVELOPING ELECTROSTATIC IMAGES AND COMPOSITION THEREFOR. DEC. 19, 1961. AUS. 0243022, CAN. 0812526, FRA. 1251476, GER. 1129511, GRB. 0944401, ITL. 0620433, JAP. 0313573.
3,577,345.—SOLID XEROGRAPHIC DEVELOPER. MAY 4, 1971. ARG. 0172448, ATR. 0325417, AUS. 0424173, BEL. 0716084, BOL. 0032708, CAN. 0902983, CHL. 0025923, CLB. 0017674, DOR. 0001461, ELS. 0001064, FRA. 1567731, GRB. 1232117, GRK. 0037628, GUA. 0002003, HOL. 0148714, IND. 0116209, ISR. 0030116, ITL. 0851653, JAM. 0001848, JAP. 0623002, LXB. 0056197, MEX. 0119320, NOR. 0131653, NZL. 0164353, PNM. 0002062. PRU. 0009911, PTG. 0049749, SPN. 0354686, STZ. 0516180, SWD. 0338238, TIW. 0005096, TRD. 0000057, TRK. 0015620, URG. 0009286, VZL. 0023666.
3,590,000.—SOLID DEVELOPER FOR LATENT ELECTROSTATIC IMAGES. JUNE 29, 1971. ARG. 0172453, ATR. 0288860, BAH. 0000093, BEL. 0716083, BOL. 33998, CAN. 0902984, CHL. 0024050, DOR. 0001460, ECD. 0000198, ELS. 0001062, FRA. 1567721, GER. 1772570, GRB. 1232118, GRK. 0037629, GUA. 0002095, IND. 0116210, ISR. 0030117, ITL. 0851651, JAM. 0002094, JAP. 0655407, LXB. 0056196, MEX. 0104566, NZL. 0164356, PLP. 0007690, PNM. 0002083, PRU. 0009495, PTG. 0049748, SPN. 0354685, STZ. 0519737, SWD. 0357071, TIW. 0004940, TRD. 0000058, TRK. 0015606, URG. 0009287, VZL. 0032392.
3,653,893.—IMAGING SYSTEM. APR. 4, 1972.
3,655,374.—IMAGING PROCESS EMPLOYING NOVEL SOLID DEVELOPER MATERIAL. APR. 11, 1972.
3,681,107.—DEVELOPMENT OF ELECTROSTATOGRAPHIC IMAGES. AUG. 1, 1972.
3,856,692.—LIQUID ELECTROSTOGRAPHIC DEVELOPER COMPOSITIONS. DEC. 24, 1974. CAN. 0940361, GRB. 1332674.
3,900,588.—NON-FILMING DUAL ADDITIVE DEVELOPER. AUG. 19, 1975. BEL. 0825924.

Class 18C 1C

3,900,589.—AN ELECTROSTATOGRAPHIC IMAGING PROCESS. AUG. 19, 1975. AUS. 0467835, BEL. 0802879, GRB. 1437041.

Class 18C 2A

3,723,114.—THERMOSETTING ELCTRSTGRPHC DVLPR OF CARRIER/PREPOLYMER OF DIALLYL PHTHALATE ISOPHTHALATE AND MXTR. MAR. 27, 1973. ARG. 0185089, BEL. 0762507, CAN. 0970195, FRA. 7104349, GRB. 1344197, ITL. 0918244, MEX. 0122234.

3,806,339.—LIQUID DEVELOPER COMPOSITION. APR. 23, 1974.

3,942,979.—IMAGING SYSTEM. MAR. 9, 1976.

3,965,021.—ELECTROSTATOGRAPHIC DEVELOPMENT-POLYBLEND TONERS. JUNE 22, 1976.

3,969,251.—DEVELOPER MIXTURE. JULY 13, 1976.

Class 18C 2A 1

RE.25,136.—ELECTROSTATIC DEVELOPER COMPOSITION AND METHOD THEREFOR-RE OF 2,940,934-D432. MAR. 13, 1962.

2,788,288.—RHEINFRANK 0000 JJ 0000 JONES 0000 WD. APR. 9, 1957. CAN. 0550574, GRB. 0768293.

2,892,794.—ELECTROSTATIC DEVELOPER AND TONER. JUNE 30, 1959.

3,079,342.—ELECTROSTATIC DEVELOPER COMPOSITION AND METHOD THEREFOR. FEB. 26, 1963. ARG. 0157131, CAN. 0726134, GUA. 0001817.

3,239,465.—XEROGRAPHIC DEVELOPER. MAR. 8, 1966. CAN. 0630295, GRB. 0952166.

Class 18C 2A 2

2,753,308.—XEROGRAPHY DEVELOPER COMPOSITION. JULY 3, 1956.

3,239,465.—XEROGRAPHIC DEVELOPER. MAR. 8, 1966. CAN. 0630295, GRB. 0952166.

Class 18C 2B

3,533,835.—ELECTROSTATOGRAPHIC DEVELOPER MIXTURE. OCT. 13, 1970. ARG. 0181296, AUS. 0417746, BEL. 0704918, CAN. 0900769, CHL. 0024909, CLB. 0017825, FRA. 1540695, GRB. 1211865, IND. 0112449, ITL. 0814857, MEX. 0100137, PRU. 0009323, SWD. 0323583, URG. 0009011, VZL. 0023668.

3,591,503.—ELECTROSTATOGRAPHIC DEVELOPER. JULY 6, 1971. ARG. 0172143, ATR. 0287491, AUS. 0418556, BEL. 0713751, CAN. 0879020, CHL. 0024256, CLB. 0017933, FRA. 1560849, GRB. 1225980, GRK. 0038397, IND. 0115457, ITL. 0833710. LXB. 0055904, MEX. 0111625, NOR. 0128297, NZL. 0152196, PLP. 0008847, PRU. 0009319, PTG. 0049455, SAF. 0682386, SPN. 0352810, STZ. 0508903, SWD. 0333868, URG. 0009139, VZL. 0023688.

3,595,794.—ELECTROSTATOGRAPHIC DEVELOPER. JULY 27, 1971. ARG. 0169109, ATR. 0290986, AUS. 0418156, BEL. 0713752, CAN. 0879021, CHL. 0024482, FRA. 1582855, GRB. 1227471, IND. 0115458, ITL. 0883043, LXB. 0055894, MEX. 0115899, NOR. 0128036, NZL. 0152195, PLP. 0007966, PRU. 0009335, PTG. 0049154, SAF. 0682358, SPN. 0352811, STZ. 0505410, SWD. 0331633, URG. 0009283, VZL. 0023687.

3,627,522.—DEVELOPER COMPOSITION AND METHOD OF USE. DEC. 14, 1971.

3,672,928.—ELECTROSTATOGRAPHIC DEVELOPERS HAVING CARRIERS COMPRISING POLYSTER COATED CORES. JUNE 27, 1972. ARG. 0184669, BEL. 0762415, CAN. 0941209, FRA. 7103845, GRB. 1344365, ITL. 0918191, JAP. 0764506.

3,704,066.—REFLEX EXPOSURE MEDIUM. NOV. 28, 1972.

3,725,283.—ELECTROSTATOGRAPHIC DEVELOPER CONTAINING UNCOATED GLASS CERAMIC CARRIER PARTICLES. APR. 3, 1973. BEL. 0777720, CAN. 0973745, FRA. 7201006, GRB. 1376457, ITL. 0946358.

3,767,578.—CARRIER MATERIAL FOR ELECTROSTATOGRAPHIC. OCT. 23, 1973. ARG. 0198052, ATR. 0322978, AUS. 0461667, BEL. 0784452, CAN. 0986351, CHL. 0027640, FRA. 7220690, GRB. 1397445, ITL. 0959791, MEX. 0127643, SPN. 0403664, STZ. 0546969, TIW. 0006042, VZL. 0032064.

3,847,604.—ELECTROSTATIC IMAGING PROCESS USING MODULAR CARRIERS. NOV. 12, 1974. ARG. 0198052, ATR. 0322978, AUS. 0461667, BEL. 0784452, CAN. 0986351, CHL. 0027640, FRA. 7220690, GRB. 1397445, ITL. 0959791, MEX. 0127643, SPN. 0403664, STZ. 0546969, TIW. 0006042, VZL. 0032064.

3,849,127.—AN ELECTROSTATOGRAPHIC PROCESS IN WHICH COATED CARRIER PARTICLES ARE USED. NOV. 19, 1974.

3,857,792.—ELECTROSTATIC DEVELOPER MIXTURE WITH A COATED CARRIER. DEC. 31, 1974.

3,914,181.—ELECTROSTATOGRAPHIC DEVELOPER MIXTURES COMPRISING FERRITE CARRIER BEADS. OCT. 21, 1975. ARG. 0194244, BEL. 0785913, GRB. 1398871, ITL. 0962400, MEX. 0126285, SPN. 0404423, VZL. 0032940.

3,923,503.—ELECTROSTATIC LATENT IMAGE DEVELOPMENT EMPLOYING STEEL CARRIER PARTICLES. DEC. 2, 1975. ARG. 0181848, ATR. 0316987, AUS. 0456820, BAH. 0000162, BEL. 0752230, CAN. 0940360, CHL. 0025833, EGR. 0095180, FRA. 7021985, GRB. 1312806, ITL. 0894287, JAP. 0728825, MEX. 0121681, NOR. 0131364, NZL. 0160479, PNM. 0002264, PTG. 0053978, SAF. 0704155, SPN. 0380913, STZ. 0548625, SWD. 0351058, TIW. 0006837, USR. 0457235.

3,939,086.—HIGHLY CLASSIFIED OXIDIZED DEVELOPER MATERIAL. FEB. 17, 1976. ARG. 0181848, ATR. 0316987, AUS. 0456820, BAH. 0000162, BEL. 0752230, CAN. 0940360, CHL. 0025833, EGR. 0095180, FRA. 7021985, GRB. 1312806, ITL. 0894287, JAP. 0728825, MEX. 0121681, NOR. 0131364, NZL. 0160479, PNM. 0002264, PTG. 0053978, SAF. 0704155. SPN. 0380913, STZ. 0548625, SWD. 0351058, TIW. 0006837, USR. 0457235.

3,942,979.—IMAGING SYSTEM. MAR. 9, 1976.

3,969,251.—DEVELOPER MIXTURE. JULY 13, 1976.

Class 18C 3

2,891,011.—DEVELOPER FOR ELECTROSTATIC IMAGES. JUNE 16, 1959.

Class 18C 4

3,467,634.—ORGANOSILICON TERPOLYMERS AND PROCESS. SEPT. 16, 1969. ARG. 0165758, AUS. 0417109, BEL. 0702403, CAN. 0857389, FRA. 1534183, GRB. 1200756, HOL. 0826202, ITL. 0826202, JAP. 0671041, MEX. 0100136, NOR. 0125392, SPN. 0343902, STZ. 0484210, SWD. 0339752, VZL. 0025437.

3,526,533.—COATED CARRIER PARTICLES. SEPT. 1, 1970. ARG. 0161341, AUS. 0418867, BEL. 0702404, CAN. 0878413, FRA. 1534184, GRB. 1205051, ITL. 0826203, JAP. 0578401, MEX. 0120334, NOR. 0122818, SPN. 0343903, STZ. 0486054, SWD. 0308987, VZL. 0032393.

3,533,835.—ELECTROSTATOGRAPHIC DEVELOPER MIXTURE. OCT. 13, 1970. ARG. 0181296, AUS. 0417746, BEL. 0704918, CAN. 0900769, CHL. 0024909, CLB. 0017825, FRA. 1540695, GRB. 1211865, IND. 0112449, ITL. 0814857, MEX. 0100137, PRU. 0009323, SWD. 0323583, URG. 0009011, VZL. 0023668.

3,713,819.—XEROGRAPHIC IMAGING AND DEVELOPMENT USING METAL OXIDE CARRIER PART. JAN. 30, 1973.

3,730,707.—METHOD OF DEVELOPING LATENT IMAGES. MAY 1, 1973.

3,752,666.—ELECTROSTATIC IMAGING PROCESS USING CARRIER BEADS CONTAINING CONDUCTIVE PARTICLES. AUG. 14, 1973.

3,839,029.—ELECTROSTATOGRAPHIC DEVELOPMENT WITH FERRITE DEVELOPER MATERIALS. OCT. 1, 1974. ARG. 0194244, BEL. 0785913, GRB. 1398871, ITL. 0962400, MEX. 0126285, SPN. 0404423, VZL. 0032940.

3,849,182.—HIGHLY SHAPE-CLASSIFIED OXIDIZED LOW CARBON HYPEREUTECTOID ELECTROSTATOGRAPHIC STEEL CARRIER PA. NOV. 19, 1974. ARG. 0181848, ATR. 0316987, AUS. 0456820, BAH. 0000162, BEL. 0752230, CAN. 0940360, CHL. 0025833, EGR. 0095180, FRA. 7021985, GRB. 1312806, ITL. 0894287, JAP. 0728825, MEX. 0121681, NOR. 0131364, NZL. 0160479, PNM. 0002264, PTG. 0053978. SAF. 0704155, SPN. 0380913, STZ. 0548625, SWD. 0351058, TIW. 0006837, USR. 0457235.

3,850,663.—CELLULOSE COATED CARRIERS. NOV. 26, 1974. ARG. 0183677, AUS. 0458322, BEL. 0763987, CAN. 0941210, EGR. 0091603, FRA. 7108585, GRB. 1345027, ITL. 0922292, MEX. 0120027, PNM. 0002440, SAF. 0711547, STZ. 0557050, SWD. 0359940, TIW. 0008177, VZL. 0032931.

3,850,676.—COATED CARRIER PARTICLES FOR ELECTROSTATOGRAPHIC DEVELOPMENT. NOV. 26, 1974.

3,856,519.—TRANSFER OF TONER USING A VOLATILE INSULATING LIQUID. DEC. 24, 1974.

3,900,587.—IMAGING PROCESS EMPLOYING TREATED CARRIER PARTICLES. AUG. 19, 1975.

3,916,064.—DEVELOPER MATERIAL. OCT. 28, 1975.

3,916,065.—ELECTROSTATOGRAPHIC CARRIER PARTICLES. OCT. 28, 1975.

Class 18C 5

3,788,994.—PRESSURE FIXABLE ELECTROSTATOGRAPHIC TONER. JAN. 29, 1974. ARG. 0200575, BEL. 0793247, CAN. 0985943, FRA. 7244381, GRB. 1406687, ITL. 0973323, STZ. 0028529, VZL. 0032608.
3,804,764.—ELECTROSTATOGRAPHIC PRESSURE SENSITIVE POLYMERIC TONER. APR. 16, 1974. ARG. 0196320, AUS. 0464392, BEL. 0793554, FRA. 7246575, GRB. 1417409, ITL. 0973325, STZ. 0028568.
3,853,778.—TONER COMPOSITION EMPLOYING POLYMER WITH SIDE CHAIN CRYSTALLINITY. DEC. 10, 1974. AUS. 0465653, BEL. 0793639, FRA. 7246888, GRB. 1423291, ITL. 0973330, SPN. 0410267.
3,893,932.—PRESSURE FIXABLE TONER. JULY 8, 1975.
3,893,934.—SOLID DEVELOPER FOR ELECTROSTATIC LATENT IMAGES. JULY 8, 1975.
3,910,846.—METHOD OF PREPARING ELECTROSCOPIC TONER PARTICLES. OCT. 7, 1975. CAN. 0984074.
3,974,078.—AN ELECTROSTATE GRAPHIC DEVELOPMENT OF ENCAPSULATED MATERIALS. AUG. 10, 1976. ARG. 0196318, AUS. 0467046, BEL. 0792115, FRA. 7239134, ITL. 0973326, MEX. 0128768, STZ. 0028567, VZL. 0033139.

Class 18C 5A

3,345,293.—COLORED ELECTROSTATOGRAPHIC TONERS CONTAINING ORGANIC DYE PIGMENTS. OCT. 3, 1967. CAN. 0834674, GRB. 1074147, JAP. 0788652.
3,864,125.—ELECTROPHOTOGRAPHIC METHOD OF MAKING AN IMAGING MASTER. FEB. 4, 1975.
3,897,249.—TONERS FOR PHTHALOCYANINE PHOTORECEPTORS. JULY 29, 1975.

Class 18C 5B

3,080,250.—SELF-TACKIFYING XEROGRAPHIC TONER. MAR. 5, 1963.
3,080,318.—THREE-COMPONENT XEROGRAPHIC TONER. MAR. 5, 1963.

Class 18C 6

3,755,177.—PROCESS OF MAKING LIQUID ELECTROSTATIC DEVELOPERS CONTAINING GELATIN. AUG. 28, 1973.
3,790,485.—PROCESS FOR PRODUCING ELECTROPHOTOGRAPHIC LIQUID DEVELOPER. FEB. 5, 1974.
3,812,037.—LIQUID DEVELOPER COMPOSITION. MAY 21, 1974.

Class 18C 6A

3,507,686.—METHOD OF COATING CARRIER BEADS. APR. 21, 1970. CAN. 0872190, GRB. 1239621, JAP. 0675782.
3,658,500.—METHOD OF PRODUCING GLASS BEADS FOR ELECTROSTATOGRAPHIC DEVELOPERS. APR. 25, 1972. CAN. 0916536, GRB. 1331485.
3,685,113.—DEVELOPER SYSTEM. AUG. 22, 1972. ARG. 0183679, BEL. 0764635, CAN. 0941211, FRA. 7110751, GRB. 1347568, ITL. 0922132, MEX. 0122432.
3,764,310.—METHOD OF PRODUCING ELECTROSTATOGRAPHIC DEVELOPER. OCT. 9, 1973.
3,789,796.—APPARATUS FOR PRODUCING DEVELOPER MATERIALS. FEB. 5, 1974.
3,908,046.—P-XYLYENE VAPOR PHASE POLYMERIZATION COATING OF ELECTROSTATOGRAPHIC PARTICLES. SEPT. 23, 1975.
3,940,514.—METHOD OF COATING ELECTROSTATOGRAPHIC CARRIER PARTICLES. FEB. 24, 1976.

Class 18C 6B

3,326,848.—SPRAY DRIED LATEX TONERS. JUNE 20, 1967. AUS. 0409084, BEL. 0666056, CAN. 0866260. FRA. 1451366, GRB. 1115653, ITL. 0717377, MEX. 0088140, SWD. 0340046.
3,338,991.—METHOD OF FORMING ELECTROSTATIC TONER PARTICLES. AUG. 29, 1967. FRA. 1450642, GRB. 1115634, HOL. 0142251, ITL. 0717378.
3,502,582.—IMAGING SYSTEMS. MAR. 24, 1970. ARG. 0171952, BEL. 0726571, CAN. 0873934, FRA. 1569382, GRB. 1237095, ITL. 0835554, MEX. 0100704, VZL. 0032414.
3,740,334.—PROCESS OF PREPARING SOLID DEVELOPERS FOR ELECTROSTATIC LATENT IMAGES. JUNE 19, 1973.
3,830,750.—ENCPSLTNG SBSTNLY SLUBL PRTN OF CORE MATL IN SBSTNLY SLBLE SHELL MATL OF DFRNT SOLUBLTY. AUG. 20, 1974. AUS. 0466018, BEL. 0793246, CAN. 0983328, GRB. 1411954, ITL. 0973317, SPN. 0410224, STZ. 0028527.
3,936,517.—METHOD FOR REDUCING PARTICLE SIZE. FEB. 3, 1976.

Class 18D

3,150,446.—BRAZING METHOD AND COMPOSITION. SEPT. 29, 1964.
3,666,429.—MATALLIZED AND BRAZED CERAMICS. MAY 30, 1972.
3,959,934.—COMPOSITION AND METHOD FOR REPAIRING SELENIUM PHOTORECEPTOR. JUNE 1, 1976.
3,971,169.—A METHOD FOR REPAIRING SELENIUM PHOTOCONDUCTORS. JULY 27, 1976.

Class 20

3,916,167.—COUNTERS. OCT. 28, 1975.

Class 20A

3,751,693.—MOVING COIL MOTOR WITH NO SPRAY FLUX. AUG. 7, 1973. AUS. 3467604, BEL. 0795400, CAN. 0980395, GRB. 1424622, ITL. 0979062, SPN. 0411470.
3,769,467.—VIBRATION DAMPED TRANSDUCER HEAD ASSEMBLY. OCT. 30, 1973. ARG. 0195905, BEL. 0795401, GRB. 1417764, ITL. 0979063, SPN. 0411538, STZ. 0558582.

Class 20A 1

RE.27,313.—BELT TRACKING SYSTEM - RE OF 3,500,694-D2586. MAR. 21, 1972.
3,435,693.—BELT TRACKING DEVICE. APR. 1, 1969. ARG. 0168295, ATR. 0283116, AUS. 0421893, BEL. 0705641, CAN. 0853440, CHL. 0023084, CLB. 0017528, DNK. 0117047, FRA. 1543079, GRB. 1180659, ITL. 0827782, MEX. 0100320, NOR. 0124530, PRU. 0009336, SAF. 0676414, SPN. 0346430, STZ. 0471736, URG. 0009729, VZL. 0023676.
3,592,071.—BELT TRACKING APPARATUS. JULY 13, 1971. ARG. 0179666, BEL. 0751117, CAN. 0925118, FRA. 7019040, GRB. 1298926, ITL. 0893540, JAP. 0770135, MEX. 0118981, SPN. 0380136.
3,593,838.—CONVEYOR BELT. JULY 20, 1971. CAN. 0883720.

Class 20A 2

2,022,891.—PHOTOCOPY MACHINE. DEC. 3, 1935.
3,498,148.—CHAIN TRAIN. MAR. 3, 1970.
3,509,780.—DOUBLE-ACTION ROTARY SOLENOID DRIVE MECHANISM. MAY 5, 1970.
3,844,179.—GEAR DRIVE FOR ELECTROPHOTOGRAPHIC PRINTING MACHINE. OCT. 29, 1974. ARG. 203483, BEL. 0816382, VZL. 0033061.

Class 20A 3

2,069,318.—PHOTOCOPY MACHINE. FEB. 2, 1937.
3,405,564.—PULLEY. OCT. 15, 1968. CAN. 0850353.
3,505,716.—ROLL APPARATUS. APR. 14, 1970.
3,791,243.—METHOD AND APPARATUS FOR FORMING EDGES OF AN ENDLESS BELT. FEB. 12, 1974.
3,932,177.—COLLAR AND METHOD OF MAKING SAME. JAN. 13, 1976.

Class 20A 4

3,329,029.—OFF-CENTER LOAD MOVING ASSEMBLY. JULY 4, 1967.
3,337,072.—LOADER. AUG. 22, 1967. CAN. 0825092, GRB. 1166619, JAP. 0605648.
3,493,269.—LOADING HEAD. FEB. 3, 1970. CAN. 0864392.
3,777,578.—LINEAR ACTUATOR. DEC. 11, 1973. CAN. 9783901.

Class 20A 5

2,025,371.—APPARATUS FOR TREATING PHOTOGRAPHIC FILM. DEC. 24, 1935.
3,112,819.—CLUTCH MECHANISM - 914. DEC. 3, 1963. CAN. 0688810.
3,213,645.—TORQUE LIMITING MECHANISM. OCT. 26, 1965. CAN. 0729978, GRB. 1035547, JAP. 0548690.
3,623,680.—CLUTCH/BRAKE MECHANISM. NOV. 30, 1971.

3,686,974.—MECHANICAL DRIVE ARRANGEMENT. AUG. 29, 1972.

Class 20A 6

3,351,831.—MOTOR SPEED CONTROL UTILIZING LIGHT SENSITIVE CONDUCTIVE AND RESISTIVE ELEMENTS. NOV. 7, 1967.
3,388,875.—WEB TRANSPORT CONTROL ASSEMBLY. JUNE 18, 1968.
3,418,046.—SIGNAL STORAGE DEVICE. DEC. 24, 1968. CAN. 0852814, GER. 1524999, GRB. 1190084, JAP. 0589515.
3,552,221.—SPEED CONVERTING MECHANISM. JAN. 5, 1971.
3,858,777.—PRINTING APPARATUS INCLUDING REGISTRATION CONTROL. JAN. 7, 1975.
3,870,934.—WEB TENSION CONTROLLER. MAR. 11, 1975.
3,909,125.—STEPPER MOTOR CONTROL. SEPT. 30, 1975.
3,917,400.—METHOD AND APPARATUS FOR MAINTAINING A PREDETERMINED PHASE RELATIONSHIP BETWEEN TWO SIGNALS. NOV. 4, 1975.
3,944,896.—PHASE SYNCHRONIZATION SYSTEM WITH START-UP SEQUENCING AND AUTOMATIC SHUTDOWN. MAR. 16, 1976.

Class 20B

3,869,896.—ROLLING PROCESS. MAR. 11, 1975. GRB. 1434131.
3,965,861.—SEPARATED ROLLER LIQUID DEVELOPMENT. JUNE 29, 1976.

Class 20B 1

2,843,295.—POWDER CLOUD GENERATOR. JULY 15, 1958.
2,862,646.—POWDER PARTICLE AEROSOL GENERATOR. DEC. 2, 1958.
2,878,972.—ROUGH SURFACE POWDER CLOUD GENERATION. MAR. 24, 1959.
2,935,234.—POWDER CLOUD GENERATING APPARATUS. MAY 3, 1960. CAN. 0655160, GRB. 0957862.
3,094,248.—XEROGRAPHIC DEVELOPING APPARATUS. JUNE 18, 1963. CAN. 0678004, GRB. 0985306.
3,129,850.—POWDER CLOUD GENERATING APPARATUS. APR. 21, 1964. CAN. 0693933, GER. 1497044, GRB. 1001237, JAP. 0436042.

Class 20B 2

2,859,129.—PROCESS FOR DEVELOPING ELECTROSTATIC IMAGES AND APPARATUS THEREFOR. NOV. 4, 1958.
3,094,248.—XEROGRAPHIC DEVELOPING APPARATUS. JUNE 18, 1963. CAN. 0678004, GRB. 0985306.
3,122,455.—XEROGRAPHIC TONER DISPENSER. FEB. 25, 1964.
3,356,248.—CONTAINER WITH A ROTATABLE CLOSURE. DEC. 5, 1967. CAN. 0825091, GRB. 1166618.
3,477,568.—ELECTROSTATIC SEPARATION OF ROUND AND NONROUND PARTICLES. NOV. 11, 1969.
3,478,600.—PARTICLE SIZE AND DISTRIBUTION ANALYZING APPARATUS. NOV. 18, 1969. CAN. 0871819, GRB. 1196449, JAP. 0667702.
3,694,068.—ROLLER RETRACTION MECHANISM IN A MULTIPLE ROLLER BELT ASSEMBLY. SEPT. 26, 1972. CAN. 0946322, GRB. 1370798.
3,698,540.—WEB SENSING MECHANISM FOR TRACKING SYSTEM. OCT. 17, 1972. CAN. 0946926.
3,702,131.—BELT TRACKING SYSTEM. NOV. 7, 1972. AUS. 0459379, BEL. 0777321, CAN. 0953673, FRA. 7147892, GRB. 1381720, ITL. 0944435, MEX. 0126336, PNM. 0002633, SPN. 0398380.
3,740,288.—METHOD OF PREPARING A TONER DISPENSER. JUNE 19, 1973.
3,840,879.—EXCESS TONER SHIELD FOR ELECTROGRAPHIC APPARATUS. OCT. 8, 1974.
3,931,792.—ABRASIVE LIQUID DEVELOPING APPARATUS. JAN. 13, 1976.

Class 20B 3

3,410,060.—XEROGRAPHIC FILTER APPARATUS. NOV. 12, 1968. CAN. 0810976, FRA. 1458648, GRB. 1114505, ITL. 0729638, JAP. 0724232.
3,570,224.—FILTER FOR ELECTROSTATOGRAPHIC DEVELOPER. MAR. 16, 1971.
3,662,884.—METHOD AND APPARATUS FOR ELECTROSTATICALLY CLASSIFYING TONER PARTICLES. MAY 16, 1972. CAN. 0956273, GRB. 1327942.
3,740,735.—AIR CIRCULATION APPARATUS. JUNE 19, 1973. GRB. 1322612.
3,909,383.—CLEANING PROCESS. SEPT. 30, 1975. CAN. 0905883.

Class 20 C

1,928,106.—SPRING TENSION DEVICE. SEPT. 26, 1933.
3,698,540.—WEB SENSING MECHANISM FOR TRACKING SYSTEM. OCT. 17, 1972. CAN. 0946926.

Class 20C 1

3,498,500.—LEVEL SENSOR. MAR. 3, 1970. CAN. 0912851, GRB. 1251128.
3,520,445.—DIELECTRIC LEVEL SENSOR. JULY 14, 1970. CAN. 0895527, GRB. 1239856.

Class 20C 2

3,357,249.—TEMPERATURE SENSOR. DEC. 12, 1967. CAN. 0810332, GRB. 1171381.
3,723,980.—TEMPERATURE COMPENSATION SYSTEM FOR MAGNETIC DISK MEMORY UNIT. MAR. 27, 1973. ARG. 0195985, BEL. 0791363, FRA. 7240560, GRB. 1408778, ITL. 0970913, MEX. 0129694, SPN. 0408629, STZ. 0028456, VZL. 0032424.

Class 20C 3

3,492,732.—WEB QUANTITY INDICATOR. FEB. 3, 1970. CAN. 0887178.

Class 20C 4

3,191,440.—PRESSURE GAUGE INSTRUMENT. JUNE 29, 1965.
3,249,760.—PRESSURE GAUGE INSTRUMENT. MAY 3, 1966.
3,907,421.—TRANSFER APPARATUS FOR ELECTROSTATIC REPRODUCING MACHINES. SEPT. 23, 1975.

Class 20C 5

3,216,247.—WIND-MEASURING METER DEVICE. NOV. 9, 1965.

Class 20C 6

3,502,163.—EQUAL ARM BALANCE WITH C-SHAPED FULCRUM SLEEVE FORMED ON BEAM. MAR. 24, 1970.
3,583,505.—SPRING SCALE. JUNE 8, 1971. CAN. 0902123, GRB. 1295477.
3,878,358.—DIGITAL POWER CONTROL. APR. 15, 1975.

Class 20C 7

2,558,773.—APPARATUS FOR CONTROLLING THE THICKNESS OF A COATING ON A TRAVELING WEB. JULY 3, 1951.
3,396,965.—SENSOR GAUGE. AUG. 13, 1968. CAN. 0822218, GRB. 1152538, JAP. 0587326.

Class 20D

2,179,164.—ATTACHMENT FOR PHOTOCOPY MACHINES. NOV. 7, 1939.
2,429,896.—LENS ADJUSTING MEANS FOR PHOTOCOPY MACHINES. NOV. 11, 1947.
3,746,502.—EVAPORATION CRUCIBLE. JULY 17, 1973. GRB. 1411236.
3,765,638.—SUCTION MOUNT. OCT. 16, 1973.
3,765,757.—TRANSPORT ARRANGEMENT FOR THIN SHEET MATERIAL. OCT. 16, 1973. BEL. 0793551, GRB. 1419978, ITL. 0972846, SPN. 0410107.

Class 20D 1

1,962,050.—ATTACHMENT FOR PHOTOGRAPHIC PRINT TREATING APPARATUS. JUNE 5, 1934.
1,977,753.—FILM TREATING APPARATUS. OCT. 23, 1934.
1,992,492.—PHOTOCOPY MACHINE. FEB. 26, 1935.
1,998,324.—PHOTOCOPY MACHINE. APR. 16, 1935.
2,019,788.—PHOTOCOPY MACHINE. NOV. 5, 1935.
2,035,558.—PHOTOCOPY MACHINE. MAR. 31, 1936.
2,050,956.—PHOTOCOPY MACHINE. AUG. 11, 1936.
2,163,451.—COPY HOLDER FOR PHOTOCOPY MACHINES. JUNE 20, 1939.
2,223,767.—MACHINE FOR FEEDING PHOTOGRAPHIC PAPER. DEC. 3, 1940.

2,430,687.—PAPER FEEDING MECHANISM FOR PHOTOCOPY MACHINES. NOV. 11, 1947.
2,956,804.—VACUUM FEED ASSEMBLY FOR FLAT PIECES. OCT. 18, 1960.
3,379,855.—FLUID FEED SYSTEM. APR. 23, 1968.
3,407,018.—TWO-AXIS ANGULAR POSITIONING APPARATUS FOR ADJUSTING THE POSITION OF AN OPTICAL ELEMENT. OCT. 22, 1968.
3,436,071.—WORK HOLDER. APR. 1, 1969. CAN. 0856095, GRB. 1174795, JAP. 0642773.
3,440,859.—CORNER FORMING APPARATUS. APR. 29, 1969. CAN. 0866532.
3,475,936.—TRANSPORT SYSTEM. NOV. 4, 1969.
3,867,027.—TRANSPORT ARRANGEMENT FOR THIN SHEET MATERIAL. FEB. 18, 1975. BEL. 0793551, GRB. 1419978, ITL. 0972846, SPN. 0410107.
3,869,896.—ROLLING PROCESS. MAR. 11, 1975. GRB. 1434131.
3,901,647.—LOW RADIATION OPEN-BOAT CRUCIBLES. AUG. 26, 1975.

Class 20D 2

3,056,967.—FASTENER DRIVING TOOL. OCT. 9, 1962.
3,091,578.—MECHANICAL BONDING LOCK. MAY 28, 1963.
3,341,681.—XEROGRAPHIC PLATE FABRICATION. SEPT. 12, 1967. CAN. 0780598, FRA. 1415795, GRB. 1070555, HOL. 0144068, IND. 0094992, ITL. 0738063.
3,876,317.—LATCH MECHANISM. APR. 8, 1975.

Class 20D 3

3,258,281.—HERMETIC SEALED COUPLING FOR CONDUITS. JUNE 28, 1966.
3,317,224.—FLANGED PIPE COUPLING HAVING METALLIC SEAL MEANS. MAY 2, 1967.
3,366,343.—DEVICE FOR FASTENING A SHAFT TO A REEL. JAN. 30, 1968.
3,604,737.—METHOD OF JOINING MATERIALS. SEPT. 14, 1971.

Class 20D 4

3,532,863.—DYNAMIC CAM TESTER. OCT. 6, 1970. CAN. 0835529.

Class 20D 5

3,596,316.—BLOW MOLDING APPARATUS. AUG. 3, 1971.

Class 20D 6

3,384,107.—BAKEABLE VACUUM VALVE. MAY 21, 1968.

Class 20D 7

3,489,463.—BRUSH SIZING APPARATUS. JAN. 13, 1970. GRB. 1243233, JAP. 0810578.

Class 20E

3,217,328.—ANTENNA WITH WIRE MESH REFLECTOR COLLAPSING IN A PINWHEEL MANNER. NOV. 9, 1965.

Class 20F

3,390,693.—PURE FLUID AMPLIFIER. JULY 2, 1968.
3,413,993.—FLUID DEVICE. DEC. 3, 1968.
3,417,770.—FLUID AMPLIFIER SYSTEM. DEC. 24, 1968.
3,459,205.—MAGNETICALLY CONTROLLED FLUID AMPLIFIER. AUG. 5, 1969.
3,496,955.—ELECTRICALLY ACTUATED BISTABLE FLUID AMPLIFIER. FEB. 24, 1970.
3,726,588.—WEB TRACKING SYSTEM. APR. 10, 1973.

Class 20 G

3,217,328.—ANTENNA WITH WIRE MESH REFLECTOR COLLAPSING IN A PINWHEEL MANNER. NOV. 9, 1965.
3,549,059.—TRIGGERING APPARATUS AND WORK LOCATING MEANS FOR AEROSOL SPRAY CANS. DEC. 22, 1970.
3,555,725.—SELF-TRAVELLING WHEEL. JAN. 19, 1971. CAN. 0900718, GRB. 1289331, JAP. 0713807.
3,688,415.—VIBRATION DEMONSTRATION. SEPT. 5, 1972.
3,747,589.—REACTION TIME TESTING APPARATUS. JULY 24, 1973.
3,818,391.—TRACKING ASSEMBLY FOR AN ENDLESS BELT ELECTROSTATOGRAPHIC MACHINE. JUNE 18, 1974.
3,840,879.—EXCESS TONER SHIELD FOR ELECTROGRAPHIC APPARATUS. OCT. 8, 1974.
3,907,421.—TRANSFER APPARATUS FOR ELECTROSTATIC REPRODUCING MACHINES. SEPT. 23, 1975.
3,941,006.—FREE FLOATING BELT TENSIONER. MAR. 2, 1976.
3,946,920.—VACUUM SYSTEM CONTROL. MAR. 30, 1976.

Class 20I

3,942,349.—CROWN DIE FOR THREAD ROLLING OF APPLICATOR ROLLS. MAR. 9, 1976.

Class 20R

3,942,349.—CROWN DIE FOR THREAD ROLLING OF APPLICATOR ROLLS. MAR. 9, 1976.

Class 21

D.240,557.—TRAY RACK. JULY 13, 1976.

Class 21A

3,905,400.—ELECTROFORMING MANDREL. SEPT. 16, 1975.

Class 21A 1

3,316,158.—FOAM METAL CONSTRUCTION AND A METHOD FOR MAKING IT. APR. 25, 1967.
3,378,469.—ELECTROFORMING TECHNIQUE AND STRUCTURE FOR REFLECTING MIRRORS. APR. 16, 1968.
3,428,533.—HIGH QUALITY SUB-MASTERS AND METHOD FOR PRODUCING THEM. FEB. 18, 1969.
3,472,679.—COATING SURFACES. OCT. 14, 1969. CAN. 0896992.
3,505,177.—ELECTROFORMING PROCESS. APR. 7, 1970.
3,520,780.—MAGNESIUM ELECTRODEPOSITION. JULY 14, 1970.
3,844,906.—DYNAMIC BATH CONTROL PROCESS. OCT. 29, 1974. BEL. 0799236, FRA. 7316539, GRB. 1421818.
3,853,614.—CYCLIC RECORDING SYSTEM BY THE USE OF AN ELASTOMER IN AN ELECTRIC FIELD. DEC. 10, 1974. ARG. 0196734, AUS. 0461213, BEL. 0777320, CAN. 0953990, FRA. 7147891, GRB. 1380057, ITL. 0944392, MEX. 0131400, SPN. 0398306.
3,876,510.—PROCESS FOR ELECTROFORMING A FLEXIBLE BELT. APR. 8, 1975.
3,905,685.—ZOOM LENS FOR FIXED CONJUGATES. SEPT. 16, 1975. CAN. 0995039.
3,954,568.—ELECTROFORMING AN ENDLESS FLEXIBLE SEAMLESS XEROGRAPHIC BELT. MAY 4, 1976. ARG. 0185811, AUS. 0449005, BEL. 0762249. CAN. 0889781, EGR. 0094306, FRA. 7103844, GRB. 1288717, ITL. 0918048, MEX. 0119465, PNM. 0002384, SPN. 0387636, STZ. 0521612, SWD. 0360753, TIW. 0007843, VZL. 0027666.
3,963,587.—PROCESS FOR ELECTROFORMING NICKEL FOILS. JUNE 15, 1976.

Class 21A 1B

3,959,109.—METHOD AND APPARATUS FOR ELECTROFORMING. MAY 25, 1976.

Class 21A 2

3,316,158.—FOAM METAL CONSTRUCTION AND A METHOD FOR MAKING IT. APR. 25, 1967.
3,378,469.—ELECTROFORMING TECHNIQUE AND STRUCTURE FOR REFLECTING MIRRORS. APR. 16, 1968.
3,428,533.—HIGH QUALITY SUB-MASTERS AND METHOD FOR PRODUCING THEM. FEB. 18, 1969.
3,577,323.—HIGH QUALITY SUBMASTERS. MAY 4, 1971.
3,927,463.—METHOD OF MAKING A CYLINDRICALLY SHAPED, HOLLOW ELECTROFORMING MANDREL. DEC. 23, 1975.
3,950,839.—ELECTROFORMING MANDREL. APR. 20, 1976.

Class 21A 3

3,352,482.—ION SPUTTER PUMPING COLLECTOR. NOV. 14, 1967.

3,437,568.—APPARATUS AND METHOD FOR DETERMINING AND CONTROLLING STRESS IN AN ELECTROFORMED PART. APR. 8, 1969.
3,799,859.—ELECTROFORMING SYSTEM. MAR. 26, 1974. GRB. 1427544.

Class 21B

3,223,878.—METHOD OF FABRICATING FINE GRIDS. DEC. 14, 1965.
3,276,919.—PROCESS FOR FORMING METAL STRUCTURES HAVING VERY FINE PORES. OCT. 4, 1966.
3,360,347.—PRODUCTION OF POUROUS MATERIALS. DEC. 26, 1967.
3,494,748.—OXIDATION RESISTANT COATING AND ARTICLE. FEB. 10, 1970.
3,666,429.—MATALLIZED AND BRAZED CERAMICS. MAY 30, 1972.
3,703,306.—METHOD OF HERMETICALLY SEALING SILICON TO A LOW EXPANSION ALLOY. NOV. 21, 1972.
3,740,830.—BRAZING CERAMICS. JUNE 26, 1973.
3,825,724.—WRAP ADJUST DEVICE FOR CONTROLLING ENGAGEMENT BETWEEN A WEB AND ROLLER. JULY 23, 1974. GRB. 1406047.
3,851,985.—COLLAR AND METHOD OF MAKING SAME. DEC. 3, 1974.
3,885,923.—GENERATION OF CURVED SURFACES ON A WORKPIECE. MAY 27, 1975.
3,911,163.—SOLDER COATING PROCESS AND APPARATUS. OCT. 7, 1975.

Class 21I

3,653,885.—PROCESS OF STABILIZING A MIGRATION IMAGE COMPRISING SELENIUM PARTICLES. APR. 4, 1972. CAN. 0937437.

Class 22A

2,771,002.—APPARATUS FOR USE WITH XEROGRAPHIC X-RAY POWDER IMAGES. NOV. 20, 1956. CAN. 0545947.
3,473,388.—ISOKINETIC PARTICLE SAMPLER. OCT. 21, 1969. CAN. 0852475, GRB. 1194569.
3,478,600.—PARTICLE SIZE AND DISTRIBUTION ANALYZING APPARATUS. NOV. 18, 1969. CAN. 0871819, GRB. 1196449, JAP. 0667702.
3,544,458.—METHOD OF FILTERING. DEC. 1, 1970. CAN. 0888335.
3,940,997.—APPARATUS AND METHOD FOR MEASURING ANGLE OF REPOSE. MAR. 2, 1976.

Class 22B

3,938,993.—XEROGRAPHIC METHOD FOR MAKING A RESPONSIVE ANSWER SYSTEM. FEB. 17, 1976. CAN. 0858780, GRB. 1235941, JAP. 0688426.
3,972,715.—PARTICLE ORIENTATION IMAGING SYSTEM. AUG. 3, 1976.

Class 22B 1

3,497,320.—AUTOMATED CHEMICAL ANALYZER - FLEXIBLE POD SYSTEM. FEB. 24, 1970. ARG. 0182336, ATR. 0308052, AUS. 0419707, BEL. 0722723, FRA. 1578476, GER. 1673342, GRB. 1218748, IND. 0113632, ITL. 0856573, LXB. 0057970, MEX. 0112299, NOR. 0131258, NZL. 0164681, PNM. 0001771, SAF. 0069935, SPN. 0348326, STZ. 0516798, SWD. 0345909, VZL. 0025948.
3,504,376.—AUTOMATED CHEMICAL ANALYZER. MAR. 31, 1970. ARG. 0177588, ATR. 0300733, AUS. 0441839, BEL. 0722721, CAN. 0921812, FRA. 1584398, GRB. 1218750, IND. 0113631, ITL. 0856574, LXB. 0057969, MEX. 0112300, NOR. 0131259, NZL. 0155344, PNM. 0001667, SAF. 0690934, SPN. 0362595, STZ. 0526109, SWD. 0365310, VZL. 0027510.
3,508,879.—ALIQUOTTING DEVICE. APR. 28, 1970. ATR. 0280666, AUS. 0429344, BEL. 0722722, CAN. 0883952, FRA. 1578475, GER. 1673343, GRB. 1218747, ITL. 0862567, LXB. 0057971, MEX. 0101480, NOR. 0131257, NZL. 0155346, SAF. 0069936, SPN. 0363624, STZ. 0494403, SWD. 0342699.
3,526,480.—AUTOMATED CHEMICAL ANALYZER. SEPT. 1, 1970. ARG. 0174584, AUS. 0452281, BEL. 0728248, CAN. 0950341, FRA. 1584397, GER. 1673340, GRB. 1218749, HOL. 1467250, ITL. 0865002, MEX. 0118203, PNM. 0001668, SPN. 0381340, STZ. 0501922, SWD. 0359925, VZL. 0025782.
3,582,283.—CHEMICAL PACKAGE. JUNE 1, 1971.

Class 22B 1A

3,477,821.—CHEMICAL PACKAGE. NOV. 11, 1969. ARG. 0169582, AUS. 0433117, BEL. 0725955, CAN. 0876261, FRA. 1596338, GRB. 1245780, HOL. 0141402, ITL. 0852626, JAP. 0805178, MEX. 0108467. PNM. 0001764, SPN. 0361841, STZ. 0531895, SWD. 0345742, VZL. 0023719.
3,477,822.—CHEMICAL PACKAGE. NOV. 11, 1969. ARG. 0169541, AUS. 0433116, BEL. 0725958, CAN. 0904725, FRA. 1596340, GRB. 1251680, HOL. 0141098, ITL. 0852625, JAP. 0802751, MEX. 0108998, PNM. 0001662, SPN. 0361844, STZ. 0530223, SWD. 0346384, VZL. 0023725.
3,480,398.—CHEMICAL PACKAGE. NOV. 25, 1969. ARG. 0169487, AUS. 0433114, BEL. 0725956, CAN. 0885006, FRA. 1596337, GER. 1816228, GRB. 1257336, HOL. 0141797, ITL. 0856875, JAP. 0805177, MEX. 0108468, PNM. 0001663, SPN. 0361842, STZ. 0530637, SWD. 0345012, VZL. 0023722.
3,480,399.—CHEMICAL PACKAGE. NOV. 25, 1969. ARG. 0169540, AUS. 0433115, BEL. 0725957, CAN. 0906891, FRA. 1596339, GRB. 1251679, HOL. 0141099, ITL. 0852624, JAP. 0802750. MEX. 0108997, PNM. 0001669, SPN. 0361843, STZ. 0526106, VZL. 0023720.
3,497,320.—AUTOMATED CHEMICAL ANALYZER - FLEXIBLE POD SYSTEM. FEB. 24, 1970. ARG. 0182336, ATR. 0308052, AUS. 0419707, BEL. 0722723, FRA. 1578476, GER. 1673342, GRB. 1218748, IND. 0113632, ITL. 0856573, LXB. 0057970, MEX. 0112299, NOR. 0131258, NZL. 0164681, PNM. 0001771, SAF. 0069935, SPN. 0348326, STZ. 0516798, SWD. 0345909, VZL. 0025948.
3,504,376.—AUTOMATED CHEMICAL ANALYZER. MAR. 31, 1970. ARG. 0177588, ATR. 0300733, AUS. 0441839, BEL. 0722721, CAN. 0921812, FRA. 1584398, GRB. 1218750, IND. 0113631, ITL. 0856574, LXB. 0057969, MEX. 0112300, NOR. 0131259, NZL. 0155344, PNM. 0001667, SAF. 0690934, SPN. 0362595, STZ. 0526109, SWD. 0365310, VZL. 0027510.
3,545,934.—CHEMICAL PACKAGE. DEC. 8, 1970. BEL. 0739751, CAN. 0887759. FRA. 6933737, GER. 1950067, GRB. 1257337, ITL. 0873750.
3,545,935.—DISPOSABLE REACTION CONTAINER FOR AN AUTOMATIC CHEMICAL ANALYZER. DEC. 8, 1970. ARG. 0179456, AUS. 0447958, BEL. 0741890, CAN. 0933494, FRA. 6939709, GER. 1957735, GRB. 1257338, HOL. 0145773, ITL. 0878322, MEX. 0113681, SPN. 0373794, STZ. 0500010, SWD. 0353399.
3,554,705.—CHEMICAL PACKAGE. JAN. 12, 1971.
3,582,283.—CHEMICAL PACKAGE. JUNE 1, 1971.
3,582,285.—CHEMICAL PACKAGE. JUNE 1, 1971.

Class 22B 1B

3,497,320.—AUTOMATED CHEMICAL ANALYZER - FLEXIBLE POD SYSTEM. FEB. 24, 1970. ARG. 0182336, ATR. 0308052, AUS. 0419707, BEL. 0722723, FRA. 1578476, GER. 1673342, GRB. 1218748, IND. 0113632, ITL. 0856573, LXB. 0057970, MEX. 0112299, NOR. 0131258, NZL. 0164681, PNM. 0001771, SAF. 0069935, SPN. 0348326, STZ. 0516798, SWD. 0345909, VZL. 0025948.
3,508,879.—ALIQUOTTING DEVICE. APR. 28, 1970. ATR. 0280666, AUS. 0429344, BEL. 0722722, CAN. 0883952, FRA. 1578475, GER. 1673343, GRB. 1218747, ITL. 0862567, LXB. 0057971, MEX. 0101480, NOR. 0131257, NZL. 0155346, SAF. 0069936, SPN. 0363624, STZ. 0494403, SWD. 0342699.
3,526,480.—AUTOMATED CHEMICAL ANALYZER. SEPT. 1, 1970. ARG. 0174584, AUS. 0452281, BEL. 0728248, CAN. 0950341, FRA. 1584397, GER. 1673340, GRB. 1218749, HOL. 1467250, ITL. 0865002, MEX. 0118203, PNM. 0001668, SPN. 0381340, STZ. 0501922, SWD. 0359925, VZL. 0025782.
3,586,446.—FLAME PHOTOMETER. JUNE 22, 1971. ARG. 0183956, BEL. 0720577, CAN. 0876239, FRA. 1581844, GRB. 1246633, ITL. 0864506, MEX. 0103300, SWD. 0342326, VZL. 0023659.

Class 22B 2

3,497,320.—AUTOMATED CHEMICAL ANALYZER - FLEXIBLE POD SYSTEM. FEB. 24, 1970. ARG. 0182336. ATR. 0308052, AUS. 0419707, BEL. 0722723, FRA. 1578476, GER. 1673342, GRB. 1218748, IND. 0113632, ITL. 0856573, LXB. 0057970, MEX. 0112299, NOR. 0131258, NZL. 0164681, PNM. 0001771, SAF. 0069935, SPN. 0348326, STZ. 0516798, SWD. 0345909, VZL. 0025948.

3,504,376.—AUTOMATED CHEMICAL ANALYZER. MAR. 31, 1970. ARG. 0177588, ATR. 0300733, AUS. 0441839, BEL. 0722721, CAN. 0921812, FRA. 1584398, GRB. 1218750, IND. 0113631, ITL. 0856574, LXB. 0057969, MEX. 0112300, NOR. 0131259, NZL. 0155344, PNM. 0001667, SAF. 0690934, SPN. 0362595, STZ. 0526109, SWD. 0365310, VZL. 0027510.

3,520,659.—METHOD AND APPARATUS FOR USE IN DETERMINING PROTHROMBIN TIME OF A BLOOD SAMPLE. JULY 14, 1970. ARG. 0176972, AUS. 0421560, BEL. 0722360, CAN. 0892696, FRA. 1588701, GER. 1804292, GRB. 1244355, HOL. 0142783, ITL. 0862597, MEX. 0105611, SPN. 0359312, SWD. 0345744, VZL. 0023706.

3,705,013.—ANALYTICAL PROCEDURES AND COMPOSITIONS THEREFOR. DEC. 5, 1972.

Class 24

3,888,892.—LIQUID CRYSTALLINE COMPOUNDS. JUNE 10, 1975.

Class 24A 2

3,329,964.—FACSIMILE RECORDING APPARATUS. JULY 4, 1967. CAN. 0809338, GRB. 1095098.

Class 24A 1

3,289,211.—ELECTRICAL RECORDING PEN. NOV. 29, 1966. ARG. 0144972, AUS. 0283737, BEL. 0663614, CAN. 0755964. FRA. 1444045, GER. 1498264, GRB. 1064344, HOL. 0145955, ITL. 0760432, MEX. 0084384, NOR. 0121120, NZL. 0141445, SPN. 0312594, STZ. 0430241, SWD. 0336857, VZL. 0017268.

3,308,475.—ELECTROVISCOUSLY CONTROLLED RECORDER. MAR. 7, 1967.

3,359,566.—MOTOR ACTION CAPILLARY. DEC. 19, 1967. CAN. 0831673, GER. 1537562, GRB. 1196932, JAP. 0583415.

3,375,528.—RECORDING PEN HAVING A PLURALITY OF CLOSELY SPACED WIRES. MAR. 26, 1968. AUS. 0284067, BEL. 0680693, CAN. 0834975, FRA. 0089948, GER. 1548876, GRB. 1148771, ITL. 0809504, JAP. 0773176, MEX. 0091261, SPN. 0326324, STZ. 0457888, SWD. 0325719.

3,484,162.—ELECTROVISCOUS RECORDING. DEC. 16, 1969.

3,512,173.—ALPHANUMERIC INK DROPLET RECORDER. MAY 12, 1970. ARG. 0180676, BEL. 0725960, CAN. 0879917, FRA. 1603645, GER. 1816194, GRB. 1227600, ITL. 0849703, JAP. 0770832, MEX. 0109982.

3,512,177.—INK RECORDING SYSTEM. MAY 12, 1970.

3,848,258.—MULTI-JET INK PRINTER. NOV. 12, 1974. BEL. 0819105.

3,893,131.—INK PRINTER. JULY 1, 1975. BEL. 0819105.

Class 24A 2

3,334,354.—DOTTING INK RECORDER. AUG. 1, 1967. CAN. 0792422.

3,627,908.—HIGH-SPEED COLOR CORRECTING SCANNER FOR MAKING COLOR PRINTING PLATES. DEC. 14, 1971. CAN. 0923428, GRB. 1335980, JAP. 0774708.

Class 24A 3

3,287,734.—MAGNETIC INK RECORDING. NOV. 22, 1966. CAN. 0808834, FRA. 1490442, GRB. 1102505, ITL. 0784569, JAP. 0571140.

3,334,000.—METHOD FOR SIMULTANEOUS PRODUCTION OF A PLURALITY OF MICROCIRCUIT WAFERS. AUG. 1, 1967.

Class 24A 4

3,480,962.—FACSIMILE RECORDING SYS. NOV. 25, 1969.

3,484,162.—ELECTROVISCOUS RECORDING. DEC. 16, 1969.

3,484,793.—IMAGE RECORDING APPARATUS INK DROPLET RECORDER WITH OPTICAL INPUT. DEC. 16, 1969.

3,553,708.—APPARATUS AND METHOD EMPLOYING PHOTOELECTROVISCOUS INK. JAN. 5, 1971.

Class 24B

3,951,658.—COLOR MODIFYING IMAGING METHOD AND ARTICLE. APR. 20, 1976.

Class 24B 1

3,833,293.—METHOD OF CREATING COLOR TRANSPARENCIES. SEPT. 3, 1974.

Class 24B 1A

2,738,705.—FILE-HOLDING DEVICE FOR CAMERA COPY SUPPORT. MAR. 20, 1956.

2,758,503.—COPY-HOLDING APPARATUS. AUG. 14, 1956.

Class 24B 1B 2

2,940,358.—IMAGE REVERSING OPTICAL SYSTEM. JUNE 14, 1960.

Class 24B 1B 3

3,459,888.—SELECTIVE PHOTOCOPIER. AUG. 5, 1969.

3,537,788.—AUTOMATIC DISCRIMINATION TECHNIQUE FOR SELECTIVE PHOTOCOPYING. NOV. 3, 1970.

Class 24B 1C

2,978,968.—RECORDING APPARATUS AND METHOD. APR. 11, 1961.

3,393,362.—PROCESS FOR DETECTING IRREGULARITIES IN A METALLIC SURFACE. JULY 16, 1968.

3,480,965.—APPARATUS FOR PYROGENICALLY RECORDING ON TRANSPARENCIES. NOV. 25, 1969.

Class 24B 1D

2,752,443.—SIGNALING DEVICE FOR PHOTOCOPY MACHINE. JUNE 26, 1956.

3,435,243.—FILM FRAME DETECTION SYSTEM. MAR. 25, 1969.

Class 24B 1G 1

3,528,355.—CAMERA-PROCESSOR. SEPT. 15, 1970. ARG. 0184627, ATR. 0303513, AUS. 0426557, BEL. 0720022, BRA. 6800654, CAN. 0864811, CHL. 0024251, CLB. 0018453, FRA. 1586179, GER. 1797177, GRB. 1244641, IND. 0117458. ITL. 0839895, LXB. 0056774, MEX. 0103737, NOR. 0128296, NZL. 0153587, PLP. 0006313, PNM. 0001980, PRU. 0010212, PTG. 0050229, SPN. 0357651, STZ. 0516171, SWD. 0338503, URG. 0009309, VZL. 0023698.

Class 24B 2A

3,349,980.—VACUUM TRANSPORT DEVICE. OCT. 31, 1967.

3,388,875.—WEB TRANSPORT CONTROL ASSEMBLY. JUNE 18, 1968.

Class 24B 2B

3,409,364.—GATE ASSEMBLY. NOV. 5, 1968.

3,409,365.—CONTACT PRINTER. NOV. 5, 1968. AUS. 0425973, JAP. 0613746.

Class 24B 2C

3,379,110.—EXPOSURE CONTROL SYSTEM. APR. 23, 1968.

3,479,119.—EXPOSURE CONTROL APPARATUS. NOV. 18, 1969.

Class 24B 2D 1

2,740,716.—PHOTOGRAPHIC STRIPPING TISSUE. APR. 3, 1956.

Class 24B 3A

2,827,428.—PHOTOGRAPHIC EMULSION PURIFICATION-IONICS. MAR. 18, 1958.

Class 24B 3B

2,913,973.—PHOTOGRAPHIC MATERIAL CONVEYING APPARATUS. NOV. 24, 1959.

2,913,974.—PHOTOGRAPHIC MATERIAL PROCESSING. NOV. 24, 1959.

Class 24B 4

3,510,216.—PROJECTION APPARATUS. MAY 5, 1970.

Class 24C 1

3,843,407.—BLADE CLEANING WITH REVERSE MOVEMENT. OCT. 22, 1974.

Class 24C 1A

3,170,395.—DUPLICATING. FEB. 23, 1965. AUS. 0410880, CAN. 0768079, FRA. 1414985, GRB. 1059659, ITL. 0740682, JAP. 0511405.
3,332,347.—DUPLICATING. JULY 25, 1967. AUS. 0271226, CAN. 0761868, FRA. 1367474, GRB. 1029997, ITL. 0730203.
3,357,353.—VAPOR THERMOGRAPHY RECORDING PROCESS AND RECORDING MEMBER USED THEREIN. DEC. 12, 1967.

Class 24C 1B

3,336,867.—DUPLICATING PROCESS. AUG. 22, 1967. CAN. 0796971, GRB. 1149056.

Class 24C 1C

3,487,775.—IMAGING SYSTEM. JAN. 6, 1970. CAN. 0873983.

Class 24C 1C 5

3,565,612.—DUPLICATING MASTERS BY THE MANIFOLD PROCESS. FEB. 23, 1971. ARG. 0193797, AUS. 0411612, BEL. 0708974, CAN. 0873277, FRA. 1549964, GER. 1671590, GRB. 1215956, ITL. 0823464, MEX. 0106608, VZL. 0023681.

Class 24C 1C 7

3,436,234.—DUPLICATING INK. APR. 1, 1969. AUS. 0408998, BEL. 0680377, CAN. 0806568, FRA. 1477914, GER. 1571875, GRB. 1151495, ITL. 0765635, JAP. 0594687, MEX. 0090362, SWD. 0336421.

Class 24C 1D

3,408,216.—IMAGE REPRODUCTION. OCT. 29, 1968. CAN. 0806942, GRB. 1127218, JAP. 0742511.
3,792,266.—THERMOGRAPHIC RECORDING USING VAPORIZED MATERIAL AND COLORED PARTICLE DEVELOPMENT. FEB. 12, 1974.

Class 24C 1E 1

3,402,660.—DRUM SUPPORT AND DRIVE SYSTEM FOR REPRODUCTION MACHINES. SEPT. 24, 1968.
3,427,965.—SHEET GRIPPER MEANS FOR REPRODUCTION MACHINE OF THE PRESSURE TRANSFER TYPE. FEB. 18, 1969.
3,429,259.—PRESSURE TRANSFER REPRODUCTION MACHINE. FEB. 25, 1969.
3,460,472.—TRANSFER SHEET CLAMPING MECHANISM FOR A REPRODUCTION MACHINE. AUG. 12, 1969.

Class 24C 1E 2

3,433,154.—PRESSURE PRODUCING MEANS FOR REPRODUCTION MACHINE. MAR. 18, 1969.

Class 24C 1E 3

3,374,732.—SELF-ALIGNING COPY DRUM STRIPOUT MECHANISM FOR REPRODUCTION MACH. MAR. 26, 1968.
3,375,780.—SHEET COUNTING MECHANISM FOR REPRODUCTION MACHINES. APR. 2, 1968.
3,380,379.—SHEET GUIDING MECHANISM FOR A REPRODUCTION MACHINE. APR. 30, 1968.
3,405,635.—PAPER SUPPORT TRAY FOR REPRODUCTION MACHINES. OCT. 15, 1968.
3,427,966.—PRESSURE TRANSFER TYPE REPRODUCTION MACHINE. FEB. 18, 1969.
3,430,558.—SHEET COUNTING SYSTEM IN A REPRODUCTION MACHINE. MAR. 4, 1969.

Class 24C 1E 4

3,375,779.—PROGRAMMING CONTROL FOR REPRODUCTION MACHINES. APR. 2, 1968.

Class 24C 1E 5

2,949,849.—STENCIL MASTER MAKING. AUG. 23, 1960.
3,083,684.—APPARATUS FOR PATTERN REPRODUCTION. APR. 2, 1963.
3,093,068.—METHOD AND APPARATUS FOR PATTERN REPRODUCTION. JUNE 11, 1963. CAN. 0624373.
3,548,748.—DUPLICATING METHOD EMPLOYING SIMULTANEOUS APPLICATION OF ELECTRIC FIELD AND EXPOSURE TO RADIATION. DEC. 22, 1970. CAN. 0882051, GRB. 1227394, JAP. 0752522.
3,681,065.—DYE TRANSFER COLOR PHOTOGRAPHY. AUG. 1, 1972.

Class 24C 1E 6

3,527,163.—SILK SCREEN MASTER. SEPT. 8, 1970.

Class 24C 1E 7

3,357,354.—REPRODUCTION METHOD. DEC. 12, 1967.
3,406,137.—IMAGING MATERIAL. OCT. 15, 1968. AUS. 0409415, BEL. 0680375, CAN. 0815085, FRA. 1477912, GER. 1571874, GRB. 1149055, ITL. 0766799, JAP. 0594685, MEX. 0090845, SWD. 0336860.
3,415,186.—DUPLICATING SYSTEM. DEC. 10, 1968.
3,446,646.—PRESSURE SENSITIVE RECEIVING AND TRANSFER SHEET. MAY 27, 1969. AUS. 0417562, BEL. 0680376, CAN. 0865673, FRA. 1477913, GER. 1571922, GRB. 0115076, ITL. 0765634, JAP. 0575982, MEX. 0090589, SWD. 0333578.

Class 24D

2,952,536.—METHOD OF PREPARING A LITHOGRAPHIC PRINGING PLATE. SEPT. 13, 1960.
2,988,988.—METHOD OF ETCHING AND DAMPENING PLANOGRAPHIC PRINTING PLATES AND FOUNTAIN SOLUTION THEREFOR. JUNE 20, 1961.
3,001,872.—PREPARING PLANOGRAPHIC PLATES AND SOLUTION THEREFOR. SEPT. 26, 1961. CAN. 0610997, GRB. 0879990.
3,275,436.—METHOD OF IMAGE REPRODUCTION UTILIZING A UNIFORM RELEASABLE SURFACE FILM. SEPT. 27, 1966. AUS. 0296158, CAN. 0811877, FRA. 1371894, GRB. 1033523, ITL. 0702168, JAP. 0508402.
3,422,759.—LITHOGRAPHIC IMAGING SYSTEM USING PHOTOCHROMIC AND THERMOCHROMIC MATERIALS. JAN. 21, 1969. CAN. 0855648, GRB. 1190102.
3,460,476.—IMAGING PROCESS. AUG. 12, 1969. ARG. 0164839, AUS. 0418783, BEL. 0691755, CAN. 0882050, FRA. 1511173, GRB. 1168268, ITL. 0787662, JAP. 0562388, MEX. 0108240, SPN. 0346128, STZ. 0480672, SWD. 0331794. VZL. 0024009.
3,547,627.—LITHOGRPHC PRINTG MASTER AND METHOD EMPLOYING A CRYSTALLINE PHOTOCONDUCTIVE IMAGING LAYER. DEC. 15, 1970.
3,554,125.—METHOD OF MAKING A LITHOGRAPHIC MASTER AND METHOD OF PRINTING THEREWITH. JAN. 12, 1971. CAN. 0882052, GRB. 1219849.
3,718,087.—APPARATUS FOR APPLYING INK AND IMMISSIBLE FLUID TO A PRINTING SURFACE. FEB. 27, 1973. ARG. 0185945, AUS. 0449639, BEL. 0759110, FRA. 7042608, GRB. 1330183, ITL. 0912865, MEX. 0120782.
3,878,168.—SILICONE ELASTOMERS. APR. 15, 1975.
3,901,151.—PROCESS FOR PREPARING WATERLESS LITHOGRAPHIC MASTERS. AUG. 26, 1975.
3,907,562.—PROCESS FOR PREPARING WATERLESS LITHOGRAPHIC MASTERS. SEPT. 23, 1975.
3,909,256.—ELECTROSTATOGRAPHIC PROCESS FOR PREPARING SCREEN PRINTING MEMBER. SEPT. 30, 1975.
3,923,504.—MIGRATION IMAGING MEMBER AND METHOD. DEC. 2, 1975.
3,948,655.—ELECTROSTATOGRAPHIC PROCESS FOR PREPARING GRAVURE PRINTING MEMBER. APR. 5, 1976.
3,951,060.—PROCESS FOR PREPARING WATERLESS LITHOGRAPHIC MASTERS. APR. 20, 1976.
3,951,063.—PROCESS FOR PREPARING REVERSIBLE CURE WATERLESS LITHOGRAPHIC MASTERS. APR. 20, 1976.
3,957,349.—IMAGING METHOD. MAY 18, 1976.
3,961,947.—PROCESS FOR PREPARING WATERLESS LITHOGRAPHIC MASTERS. JUNE 8, 1976.
3,968,278.—IMAGING METHOD. JULY 6, 1976.
3,971,316.—PROCESS FOR SMOOTHING WATERLESS LITHOGRAPHIC MASTERS. JULY 27, 1976.

Class 24E

3,315,602.—FORMING OF PRINTING PLATES. APR. 25, 1967. CAN. 0852683, GER. 1267227, GRB. 1132071, JAP. 0532965.
3,443,517.—ELECTROSTATIC DUPLICATION SYSTEM EMPLOYING RELIEF PRINTING PLATE. MAY 13, 1969. CAN. 0873982, GRB. 1212370, JAP. 0641477.
3,456,586.—PROCESS FOR MAKING AND USING A RELIEF PRINTING MASTER. JULY 22, 1969.
3,589,290.—RELIEF IMAGING PLATES MADE BY REPETITIVE XEROGRAPHIC PROCESSES. JUNE 29, 1971. CAN. 0896949.
3,957,348.—METHOD FOR ALTERING ELLIPTICALLY POLARIZED LIGHT. MAY 18, 1976.

Class 24F

3,445,226.—FROST GRAVURE PRINT MASTER. MAY 20, 1969. CAN. 0842443, FRA. 1480896, GRB. 1136029, ITL. 0771305, JAP. 0605647, MEX. 0093298.
3,559,570.—METHOD OF PREPARING AND USING A GRAVURE PRINTING PLATE. FEB. 2, 1971. CAN. 0844544, GRB. 1198142.
3,561,358.—GRAVURE IMAGING SYSTEM. FEB. 9, 1971. CAN. 0908257, GRB. 1201819, JAP. 0594737.
3,638,567.—METHOD OF PREPARING AND UTILIZING A GRAVURE PRINTING MASTER. FEB. 1, 1972.
3,801,315.—GRAVURE IMAGING SYSTEM. APR. 2, 1974. CAN. 0991245, GRB. 1411237.
3,918,400.—BLADE MOUNTING ASSEMBLIES. NOV. 11, 1975. BEL. 0816534.
3,980,404.—XEROGRAPHIC APPARATUS HAVING IMPROVED FLUID DISPENSING MEMBER. SEPT. 14, 1976.

Class 24G

3,565,978.—REPLICATION OF SURFACE DEFORMATION IMAGES. FEB. 23, 1971. AUS. 0417038, BEL. 0710829, CAN. 0879916, FRA. 1583418, GER. 1621783, GRB. 1221342, ITL. 0863054, MEX. 0096672.
3,592,114.—APPARATUS FOR JUSTIFYING A REPRODUCED LINE OF CHARACTERS. JULY 13, 1971.
3,678,850.—POROUS PRINTING PLATE PREPARED FROM PARTICULATE PHOTOSENSITIVE RESINOUS MATERIAL. JULY 25, 1972. CAN. 0844327, GRB. 1188376, JAP. 0635879.

Class 25

3,692,659.—ELECTROLYTIC REVERSIBLE COLOR DISPLAY DEVICE. SEPT. 19, 1972. CAN. 0932427, GRB. 1356187.

Class 25A

3,692,404.—STRIPPABLE LAYER RELIEF PRINTING. SEPT. 19, 1972.
3,900,817.—SPHERICAL POTENTIOMETER WITH BALL CONTACT MEANS. AUG. 19, 1975.

Class 25A 1

3,061,911.—METHOD OF MAKING PRINTED CIRCUITS. NOV. 6, 1962.
3,075,866.—METHOD OF MAKING PRINTED CIRCUITS. JAN. 29, 1963.
3,207,127.—APPARATUS FOR FORMING COATINGS ON PRINTED CIRCUIT BOARDS. SEPT. 21, 1965. CAN. 0733463, FRA. 1374360, GER. 1490985, GRB. 1053284, ITL. 0696974.
3,217,209.—PRINTED CIRCUITS WITH RESISTIVE AND CAPACITIVE ELEMENTS. NOV. 9, 1965. CAN. 0782178, FRA. 1300771, GER. 1202853, GRB. 0978571, ITL. 0647493, JAP. 0430795.
3,219,509.—AN APPARATUS FOR AUTOMATIC FABRICATION OF MICROCIRCUITRY. NOV. 23, 1965. CAN. 0785448, GRB. 1031288, JAP. 0477810.
3,288,639.—METHOD FOR MAKING A PLURAL LAYERED PRINTED CIRCUIT BOARD. NOV. 29, 1966.
3,485,934.—CIRCUIT BOARD. DEC. 23, 1969.
3,893,409.—APPARATUS FOR SOLDER COATING PRINTED CIRCUIT. JULY 8, 1975.

Class 25A 2

3,134,930.—MICROMINIATURE CIRCUITRY. MAY 26, 1964.
3,164,750.—ELECTRONIC PACKAGING APPARATUS. JAN. 5, 1965.
3,445,926.—PRODUCTION OF SEMICONDUCTOR DEVICES BY USE OF ION BEAM IMPLANTATION. MAY 27, 1969.
3,906,537.—SOLID STE ELMNT CMPRSNG SMI-CNDCTVE GLS CMPSTN EXHBING NGTVE INCRMNTL RSISTNCE AND TRSHLD SWTCHNG. SEPT. 16, 1975. BEL. 0820772.
3,956,042.—SELECTIVE ETCHANTS FOR THIN FILM DEVICES. MAY 11, 1976.

Class 25A 3

3,244,556.—ABRASION FOR THIN FILM RESISTANCE CONTROL. APR. 5, 1966. CAN. 0788954, FRA. 1385420, GRB. 1054076, ITL. 0705899, JAP. 0453904.
3,274,372.—SOLID VAPORIZATION. SEPT. 20, 1966.
3,287,161.—METHOD FOR FORMING A THIN FILM RESISTOR. NOV. 22, 1966. CAN. 0819895, ITL. 0705900, JAP. 0499787.
3,352,731.—THIN FILM PRINTED CIRCUIT. NOV. 14, 1967. AUS. 0296168, CAN. 0790796, FRA. 1419084, GER. 1490987, GRB. 1077686, ITL. 0739442, JAP. 0537661.
3,413,716.—THIN FILM INDUCTOR ELEMENTS. DEC. 3, 1968. CAN. 0841245, FRA. 1476476, GRB. 1149759.
3,832,766.—APPARATUS FOR ASSEMBLING A PLATED WIRE MEMORY PLANE. SEPT. 3, 1974. CAN. 0942420, GRB. 1376654.

Class 25A 4

3,317,656.—ELECTRICAL CONNECTION FOR SHEATHED CONDUCTORS. MAY 2, 1967.
3,603,357.—BACKWIRING. SEPT. 7, 1971.
3,644,659.—CABLE CONSTRUCTION. FEB. 22, 1972.
3,792,227.—FUSER APPARATUS. FEB. 12, 1974.
3,847,479.—COVER FOR WIRE WRAPPED CARD CHASSIS. NOV. 12, 1974.
3,903,937.—BACK WIRING. SEPT. 9, 1975.

Class 25A 4

3,869,696.—FUSER APPARATUS. MAR. 4, 1975.

Class 25B

3,688,127.—DIGITAL CIRCUIT LOGIC. AUG. 29, 1972.
3,937,986.—LINEAR WAVEFORM GENERATOR. FEB. 10, 1976.
3,975,755.—STABLE NON-CRYSTALLINE MATERIAL FOR SWITCHING DEVICES. AUG. 17, 1976.

Class 25B 1

3,384,792.—STACKED ELECTRODE FIELD EFFECT TRIODE. MAY 21, 1968.
3,584,268.—INVERTED SPACE CHARGE LIMITED TRIODE. JUNE 8, 1971.
3,599,321.—INVERTED SPACE CHARGE LIMITED TRIODE. AUG. 17, 1971.

Class 25B 2

3,510,735.—HIGH SPEED SEMICONDUCTOR. MAY 5, 1970.
3,673,572.—ELECTROLUMINESCENT DEVICE. JUNE 27, 1972. CAN. 0919286.
3,697,163.—PLUG-IN VACUUM AND CIRCUIT SYSTEM FOR ELECTROSTATIC PRINTING MACHINES. OCT. 10, 1972. CAN. 0941883.

Class 25B 3

3,551,727.—THERMIONIC CONVERTER HAVING A LOW FUNCTION COLLECTOR ELECTRODE. DEC. 29, 1970.
3,928,812.—PROGRAMMABLE BIT CLOCK OSCILLATOR FOR CONTROLLING THE PROCESSING OF BINARY DIGITS. DEC. 23, 1975.

Class 25B 4

3,579,031.—ZERO ARC DROP THYRATRON. MAY 18, 1971.

Class 25C

3,937,937.—PRIMARY POWER FAULT DETECTOR. FEB. 10, 1976.

Class 25C 1

3,296,483.—WIDEBND AMPLER UTLZNG COMN ELCTRN BEAM FR INTRACTN W/HIFRQCY TRVLGWAVE LINE AND W/LOWFRQCY ELCTRN M. JAN. 3, 1967.
3,299,367.—FEEDBACK AMPLIFIER. JAN. 17, 1967.
3,404,341.—ELECTROMETER UTILIZING A DUAL PURPOSE FIELD-EFFECT TRANSISTOR. OCT. 1, 1968.
3,457,520.—FIELD EFFECT TRANSISTOR BUFFER AMPLIFIER. JULY 22, 1969. CAN. 0830628, FRA. 1541017, GER. 1562109, GRB. 1189515, ITL. 0806188, JAP. 0573712.
3,525,948.—SEISMIC AMPLIFIERS. AUG. 25, 1970.
3,594,654.—DIRECT COUPLED DIFFERENTIAL AMPLIFIER. JULY 20, 1971.
3,790,288.—PHOTOMETER INCLUDING VARIABLE AMPLIFICATION AND DARK CURRENT COMPENSATION. FEB. 5, 1974.

Class 25C 2

2,475,722.—WEB FEED CONTROL. JULY 12, 1949.
3,316,495.—LOW LEVEL COMMUTATOR. APR. 25, 1967.
3,426,259.—ELECTRIC CONTROL CIRCUITS FOR SEQUENTIAL OPERATION OF MOTIVE MEANS. FEB. 4, 1969.
3,454,884.—DUTY CYCLE CONTROL CIRCUIT. JULY 8, 1969. CAN. 0859886, GRB. 1195983, JAP. 0576017.
3,612,907.—SELF-CHECKING FLIP-FLOP. OCT. 12, 1971.
3,668,414.—TRANSITION INTEGRATION SWITCHING AMPLIFIER. JUNE 6, 1972. ARG. 0183473, AUS. 0460647, BEL. 0765005, CAN. 0930432, FRA. 7111626, GRB. 1334407, ITL. 0921529, MEX. 0119755, USR. 0420197, VZL. 0027511.
3,795,857.—ELECTRICAL CONNECTOR TESTING APPARATUS HAVING A PLURALITY OF AND GATES. MAR. 5, 1974.
3,806,242.—APPARATUS FOR REGULATING OPERATION OF DEV IN ACCORDANCE W SUPPLY OF MATERIAL UPON WHICH DEV OPER. APR. 23, 1974. GRB. 1387190.
3,828,222.—FLASH LAMP CIRCUIT. AUG. 6, 1974.
3,856,997.—INDICATING AND SWITCHING APPARATUS. DEC. 24, 1974. BEL. 0809124.
3,866,051.—DIGITAL INTERFACE MODULE. FEB. 11, 1975. BEL. 0810490.
3,932,770.—CONTROL CIRCUIT FOR SWITCHING TRIACS. JAN. 13, 1976.

Class 25C 3

3,311,810.—STATIC FREQUENCY MULTIPLIER UTILIZING A PLURALITY OF SATURABLE MAGNETIC CORES. MAR. 28, 1967.
3,340,416.—RADIATION GENERATOR HVNG A CONDCTV COATNG ON A PIEZO-ELCTRC DIFFRCTN GRATING FOR VARYNG OTPT FR. SEPT. 5, 1967.
3,373,377.—SELF-ADJUSTING VARIABLE FREQUENCY SAWTOOTH GENERATOR. MAR. 12, 1968.
3,543,080.—CRT PINCUSHION DISTORTION CORRECTION APPARATUS. NOV. 24, 1970.
3,659,207.—MULTI-WAVE FORM GENERATION FROM A SINGLE TAPPED DELAY LINE. APR. 25, 1972.

Class 25C 4

RE.27,720.—SIGNAL STORAGE DEVICE - RE OF 3416,861-D1593. AUG. 7, 1973.
3,280,309.—LOGARITHMIC PULSE COUNTER. OCT. 18, 1966.
3,422,287.—PULSE STRETCHING CIRCUIT FOR GENERATING PULSES OF MINIMUM WIDTH. JAN. 14, 1969. AUS. 0408950, CAN. 0814593, GRB. 1087749, ITL. 0773401, SWD. 0337041.
3,593,043.—PULSE SHAPING CIRCUIT. JULY 13, 1971.
3,600,610.—TIME DELAY CIRCUIT FOR A RADIANT ENERGY PROTECTIVE APPARATUS. AUG. 17, 1971.
3,757,032.—METHOD AND APPARATUS FOR SELECTIVELY ENABLING A REMOTE RECEIVER. SEPT. 4, 1973.
3,781,548.—CONTROL SYSTEM. DEC. 25, 1973.
3,816,727.—ECHO CHECK CIRCUIT. JUNE 11, 1974. FRA. 7341866, GRB. 1422835.
3,839,665.—APP MEASRNG RELTV VELCTY MOVBL MEMBR INCLDNG MEANS TO DETECT VELCTY FROM POSITION ENCODER. OCT. 1, 1974. CAN. 0980409, GRB. 1290090.
3,863,143.—APP FOR RECORDING THE OCCURRENCE OF A PREDETERMINED OPERATION BY SENSING MAGNETIC FIELD OPERATION. JAN. 28, 1975.
3,931,580.—DIGITAL LINE RECEIVER CIRCUIT. JAN. 6, 1976.
3,971,919.—PROGRAMMABLE BILLING SYSTEM. JULY 27, 1976. BEL. 0812673.

Class 25C 5

3,275,837.—XEROGRAPHIC CHARGING APPARATUS. SEPT. 27, 1966. ARG. 0158430, ATR. 0242511, AUS. 0276177, BEL. 0642095, CAN. 0753356, FRA. 1385736, GER. 1488286, GRB. 1040264, ITL. 0712888, JAP. 0477814, MEX. 0075819, STZ. 0460930, SWD. 0314133.
3,496,385.—HIGH VOLTAGE COMPENSATED TRANSISTORIZED SWITCHING APPARATUS. FEB. 17, 1970. CAN. 0853862, FRA. 1521443, GRB. 1181718, ITL. 0793728, JAP. 0592682.
3,522,509.—FLOATING POWER SUPPLY. AUG. 4, 1970.
3,809,916.—DUAL CORD INTERLOCK. MAY 7, 1974. GRB. 1423758.
3,870,903.—PHASE CONTROLLED POWER SUPPLY. MAR. 11, 1975.
3,922,595.—HIGH POWER REGULATED D C SUPPLY. NOV. 25, 1975.

Class 25C 6

3,192,519.—DIGITAL TRANSIENT ANALYZER. JUNE 29, 1965.
3,376,490.—SYNTHESIZED WAVE STATIC INVERTERS. APR. 2, 1968.
3,508,080.—BRIDGE GATING NETWORK HAVING POWER GAIN. APR. 21, 1970.
3,555,540.—DIGITAL TO ANALOG CONVERTER WITH SMOOTHED RECOVERY. JAN. 12, 1971.
3,599,037.—GAS LAMP LEAD BALLAST CIRCUIT HAVING FEED CONTROL. AUG. 10, 1971. ARG. 0182960, BEL. 0749784, CAN. 0907126, FRA. 7015813, GRB. 1308525, ITL. 0900023, MEX. 0116550.
3,638,089.—SPEED CONTROL SYSTEM HAVING HIGH AND LOW LEVEL SPEED MEANS. JAN. 25, 1972. GRB. 1322611.
3,670,269.—AUTOMATIC TRANSVERSAL EQUALIZER. JUNE 13, 1972. CAN. 0932412, GRB. 1353018.
3,689,915.—ENCODING SYSTEM. SEPT. 5, 1972. CAN. 0870252, GER. 1562051, GRB. 1207701, JAP. 0675600.
3,691,542.—MAGNETIC MEMORY DISK DRIVE APPARATUS WITH REDUCED R.F. NOISE. SEPT. 12, 1972. GRB. 1328717.
3,699,555.—APPARATUS FOR RAPID ACTION DISPLACEMENT CONTROL. OCT. 17, 1972. CAN. 985413, GRB. 1366124.
3,737,569.—TRANSMISSION DEVICE. JUNE 5, 1973.
3,742,374.—TRANSDUCER DEVICE. JUNE 26, 1973.
3,761,799.—CURRENT STABILIZING CIRCUIT HAVING MINIMAL LEAKAGE CURRENT EFFECTS. SEPT. 25, 1973. BEL. 0792285. GRB. 1395600, ITL. 0971515, MEX. 131737.
3,778,817.—OUTPUT KEYBOARD APPARATUS AND SIGNAL TRANSLATING METHODS THEREFOR. DEC. 11, 1973.
3,795,857.—ELECTRICAL CONNECTOR TESTING APPARATUS HAVING A PLURALITY OF AND GATES. MAR. 5, 1974.
3,818,297.—MOTOR CONTROL APPARATUS. JUNE 18, 1974.
3,832,065.—DRUM TRACK DETECTOR. AUG. 27, 1974.
3,880,516.—DIAGNOSTIC CIRCUIT BOARD. APR. 29, 1975. BEL. 0808231.
3,904,922.—LAMP CONTROL AND LAMP SWITCH CIRCUIT. SEPT. 9, 1975.
3,906,194.—SIGNAL PROCESSOR. SEPT. 16, 1975.
3,909,125.—STEPPER MOTOR CONTROL. SEPT. 30, 1975.
3,918,046.—DIGITAL TO ANALOG CONVERTER. NOV. 4, 1975. ARG. 0197211, BEL. 0795801, GRB. 1417772, ITL. 0979289, MEX. 131264, SPN. 0411883, STZ. 0564887.
3,922,595.—HIGH POWER REGULATED D C SUPPLY. NOV. 25, 1975.
3,928,772.—TIME DEPENDENT FAULT DETECTOR. DEC. 23, 1975. BEL. 0826690.

Class 25C 4

3,875,387.—MAGNETIC OPERATIONS MONITOR. APR. 1, 1975.

Class 25D 1

3,911,420.—DISPLAY SYSTEM INCLUDING A HIGH-RESOLUTION CHARACTER GENERATOR. OCT. 7, 1975.

Class 26

D.225,572.—BOOK STACKING UNIT FOR XEROGRAPHIC REPRODUCTION MACHINE. DEC. 19, 1972.
D.231,127.—COPYING MACHINE-LARGE DOCUMENT COPYING FRAME-DECOY. APR. 2, 1974.
D.231,128.—COPYING MACHINE. APR. 2, 1974.
D.231,129.—COPYING MACHINE. APR. 2, 1974.
D.231,564.—COPYING MACHINE. APR. 30, 1974.
D.236,446.—CART. AUG. 26, 1975.
D.236,491.—COMPUTER CABINET. AUG. 26, 1975.
D.236,961.—BALANCE SCALE. SEPT. 30, 1975.
D.238,450.—PAPER CASSETTE. JAN. 13, 1976.
D.238,966.—COPIER EVENT RECORDER. FEB. 24, 1976.
D.239,063.—STORAGE UNIT. MAR. 9, 1976.
D.239,064.—STORAGE UNIT. MAR. 9, 1976.
D.239,065.—STORAGE UNIT. MAR. 9, 1976.
D.239,066.—STORAGE UNIT. MAR. 9, 1976.
D.239,067.—STORAGE AND DISPLAY UNIT. MAR. 9, 1976.
D.239,106.—SEMICONDUCTOR EDUCATIONAL BOARD. MAR. 9, 1976.
D.239,107.—PARALLEL RL/RC CIRCUITS EDUCATIONAL BOARD. MAR. 9, 1976.
D.239,108.—RLC CIRCUITS EDUCATIONAL BOARD. MAR. 9, 1976.
D.239,109.—SERIES RL AND RC CIRCUITS EDUCATIONAL BOARD. MAR. 9, 1976.
D.239,110.—EDUCATIONAL DEVICE FOR LEARNING ABOUT RECTIFIERS AND FILTERS. MAR. 9, 1976.
D.239,351.—STORAGE AND DISPLAY UNIT. MAR. 30, 1976.
D.239,392.—COMPUTER CABINET. MAR. 30, 1976.
D.239,750.—STORAGE UNIT. MAY 4, 1976.
D.239,995.—STORAGE UNIT. MAY 25, 1976.
D.240,192.—DESIGN FOR MICROFILM REEL. JUNE 8, 1976.
D.240,540.—COMPUTER TERMINAL. JULY 13, 1976.
D.240,554.—DUPLICATING MACHINE WITH SORTER. JULY 13, 1976.
D.240,555.—SORTER. JULY 13, 1976.

Class 26A

D.200,130.—XEROGRAPHIC CAMERA. JAN. 19, 1965.
D.200,448.—DOCUMENT REPRODUCING APPARATUS. FEB. 23, 1965.
D.205,806.—REPRODUCTION MACHINE. SEPT. 20, 1966.
D.227,933.—SORTER. JULY 24, 1973.
D.236,850.—CONTROL PANEL FOR A COPIER. SEPT. 16, 1975.
D.237,905.—CONTROL PANEL OF A COLOR ELECTROPHOTOGRAPHIC PRINTING MACHINE. DEC. 2, 1975.
D.238,779.—DOCUMENT TRAY. FEB. 10, 1976.
D.238,818.—PLATEN COVER FOR COPIER. FEB. 10, 1976.
D.239,138.—XEROGRAPHIC COPIER. MAR. 9, 1976.

Class 26A 1

D.163,640.—XEROGRAPHIC COPYING DEVICE. JUNE 12, 1951.
D.165,993.—PAPER REGISTRATION GUIDE FOR ELECTROPHOTOGRAPHIC COPYING MACHINE. FEB. 19, 1952.
D.172,906.—A XEROGRAPHIC PROCESSOR. AUG. 24, 1954.
D.186,832.—DOCUMENT REPRODUCING APPARATUS. DEC. 8, 1959.
D.188,633.—DOCUMENT REPRODUCING APPARATUS. AUG. 16, 1960.
D.193,450.—DOCUMENT REPRODUCING APPARATUS. AUG. 21, 1962.
D.194,815.—DOCUMENT REPRODUCING APPARATUS. MAR. 12, 1963.
D.200,272.—DOCUMENT REPRODUCING APPARATUS. FEB. 9, 1965. CAN. 2092730.
D.200,448.—DOCUMENT REPRODUCING APPARATUS. FEB. 23, 1965.
D.205,558.—REPRODUCTION MACHINE. AUG. 16, 1966.
D.205,806.—REPRODUCTION MACHINE. SEPT. 20, 1966.
D.208,337.—XEROGRAPHIC DOCUMENT REPRODUCING APPARATUS OR SIMILAR ARTICLE. AUG. 15, 1967.
D.210,558.—DOCUMENT REPRODUCING MACHINE. MAR. 19, 1968.
D.210,630.—DOCUMENT REPRODUCING APPARATUS. MAR. 26, 1968.
D.210,856.—DOCUMENT REPRODUCING APPARATUS. APR. 23, 1968.
D.214,699.—DOCUMENT REPRODUCING MACHINE. JULY 15, 1969. ARG. 0011028, CAN. 2543184, MEX. 0011135.
D.218,199.—DOCUMENT REPRODUCING MACHINE. JULY 28, 1970. CAN. 0033011.
D.218,201.—REPRODUCTION MACHINE. JULY 28, 1970. ARG. 0014313, BEL. 0017005, CAN. 0033518, CHL. 0000996, GRB. 0946818, JAP. 0363075, MEX. 0011194, PNM. 0002073, VZL. 0000744.
D.219,889.—XEROGRAPHIC PROCESSOR HOUSING. FEB. 9, 1971.
D.221,694.—XEROGRAPHIC PROCESS HOUSING. AUG. 31, 1971.
D.227,931.—ELECTROPHOTOGRAPHIC PRINTING MACHINE. JULY 24, 1973.
D.230,513.—REPRODUCTION MACHINE. FEB. 26, 1974.
D.238,737.—COPYING MACHINE STAND. FEB. 10, 1976.

Class 26A 2

D.214,959.—AUTOMATIC DOCUMENT FEEDING APPARATUS FOR XEROGRAPHIC REPRODUCING MACHINES OR THE LIKE. AUG. 12, 1969. CAN. 0032540, GER. DES5715, GRB. 0942720.
D.227,034.—DOCUMENT FEEDER FOR A XEROGRAPHIC REPRODUCTION. MAY 29, 1973.

Class 26A 3

D.200,129.—XEROGRAPHIC TRANSFER AND FUSING APPARATUS. JAN. 19, 1965.
D.233,481.—XEROGRAPHIC VAPOR FUSING APPARATUS. OCT. 29, 1974.

Class 26A 4

D.201,405.—XEROGRAPHIC PRINTER. JUNE 15, 1965.
D.220,188.—MOBILE PRINTER. MAR. 16, 1971. CAN. 0033207, GER. 0MR6294, GRB. 0946460.
D.230,517.—COMPUTER OUTPUT PRINTER. FEB. 26, 1974.
D.232,125.—CHARACTER PRINT MEMBER. JULY 16, 1974.
D.237,010.—COMBINED RIBBON AND CARTRIDGE THEREFOR. SEPT. 30, 1975. GRB. 0967791.
D.238,904.—CHARACTER PRINT MEMBER. FEB. 17, 1976.
D.238,968.—CHARACTER PRINT MEMBER. FEB. 24, 1976. GRB. 0967792.

Class 26A 5

D.200,130.—XEROGRAPHIC CAMERA. JAN. 19, 1965.

Class 26B

D.209,408.—CABINET FOR SORTING AND HOLDING SHEETS OF PRINTED MATERIAL. NOV. 28, 1967.
D.209,409.—MODULAR CABINET FOR SORTING AND HOLDING SHEETS OF PRINTED MATERIAL. NOV. 28, 1967.
D.209,872.—DOCUMENT REPRODUCING AND SORTING MACHINE. JAN. 9, 1968.
D.212,227.—A TAPE CONTRL UNIT FOR AN AUTOMATIC SORTER OR THE LIKE. SEPT. 17, 1968.
D.224,054.—XEROGRAPHIC REPRODUCTION MACHINE OR THE LIKE. JUNE 27, 1972.
D.230,515.—DOCUMENT REPRODUCING AND SORTING MACHINE. FEB. 26, 1974.
D.236,330.—REPRODUCTION MACHINE STACKING CART. AUG. 19, 1975.
D.236,924.—PAPER HANDLING STAND. SEPT. 30, 1975.
D.237,871.—REPRODUCTION MACHINE STACKING CART. DEC. 2, 1975.
D.238,779.—DOCUMENT TRAY. FEB. 10, 1976.

Class 26C

D.205,910.—A CAN. OCT. 4, 1966.
D.208,377.—CONTAINER FOR XEROGRAPHIC TONER POWDER. AUG. 22, 1967.
D.211,928.—BOTTLE. AUG. 13, 1968.
D.218,152.—CONTAINER FOR XEROGRAPHIC POWDER. JULY 28, 1970. CAN. 0032629, GRB. 0944047.
D.236,694.—DEVELOPER MIX STORAGE CONTAINER. SEPT. 9, 1975.
D.240,201.—TONER PARTICLE STORAGE CONTAINER-DESIGN FOR TONER CARTRIDGE. JUNE 8, 1976.

Class 26D

D.220,011.—ARTICLE ADDRESSING MACHINE. FEB. 23, 1971.

Class 26D 1

D.216,647.—SPRING SCALE. FEB. 24, 1970. CAN. 0032577, GRB. 0943939.
3,737,896.—APPARATUS FOR RECOVERY OF RECORDED BIT INFORMATION IN A MAGNETIC RECORDING MEDIUM. JUNE 5, 1973. BEL. 0790688, STZ. 0563642.

Class 26D 4

3,666,948.—LIQUID CRYSTAL INFRARED IMAGING SYSTEM HAVING AN UNDISTURBED IMAGE ON A DISTURBED BACKGROUND. MAY 30, 1972. CAN. 0964455, GRB. 1387276.

Class 26E

D.200,128.—FACSIMILE RECEIVER. JAN. 19, 1965.

Class 26E 1

D.200,127.—FACSIMILE TRANSMITTER. JAN. 19, 1965.
D.200,128.—FACSIMILE RECEIVER. JAN. 19, 1965.
D.215,218.—FACSIMILE TRANSCEIVER. SEPT. 16, 1969. ARG. 0010244, BEL. 0016600, CAN. 2493134, FRA. 0096592, GER. 0005411, GRB. 0939330, MEX. 0010900.
D.218,170.—FACSIMILE TRANSCEIVER. JULY 28, 1970.
D.225,860.—HOUSING FOR ELECTRONIC APPARATUS. JAN. 9, 1973.
D.225,861.—HOUSING FOR ELECTRONIC APPARATUS. JAN. 9, 1973.
D.225,867.—UNATTENDED TELEPHONE ANSWERING APPARATUS OR SIMILAR ARTICLE. JAN. 9, 1973.
D.227,121.—FACSIMILE TRANSCEIVER APPARATUS. JUNE 5, 1973.
D.227,122.—FACSIMILE TRANSCEIVER APPARATUS. JUNE 5, 1973.

Class 26E 2

D.215,849.—A ROLL-FEED APPARATUS FOR A FACSIMILE TRANSCEIVER. NOV. 4, 1969. ARG. 0011067, BEL. 0016764, CAN. 0032344, GER. DES5719, GRB. 0942723, ITL. 0138774, MEX. 0010975, PNM. 0001983, VZL. 0000663.
D.216,123.—FLEXIBLE SHEET MATERIAL GUIDE FOR A FACSIMILE TRANSCEIVER OR SIMILAR ARTICLE. NOV. 25, 1969. GRB. 0942748.
D.216,564.—GUIDE FOR FLEXIBLE SHEET MATERIAL FOR FACSIMILE TRANSCEIVER OR SIMILAR ARTICLE. FEB. 10, 1970. ARG. 0011068, BEL. 0016763, GER. DES5716, GRB. 0942723, ITL. 0138775, MEX. 0011018, PNM. 0001401, VZL. 0000662.

Class 26E 3

D.210,589.—ELECTRONIC ADAPTER FOR FACSIMILE COMPUTER SYSTEM. MAR. 26, 1968.

Class 26F

D.203,012.—DESIGN FOR A MACHINE FOR APPLYING INTELLIGENCE TO A MOVING ARTICLE. NOV. 23, 1965.

Class 26F 1

D.202,746.—MICROFICHE PRINTER. NOV. 2, 1965.
D.217,739.—COMBINED MICROFILM VIEWER AND REPRODUCING MACHINE ACCESSORY. JUNE 2, 1970.
D.218,782.—PROJECTION VIEWER. SEPT. 22, 1970. CAN. 0033031, GER. OMR6147, GRB. 0945494, JAP. 413894.
D.218,783.—COMBINATION FILM VIEWING AND REPRODUCING MACHINE. SEPT. 22, 1970. CAN. 0033032, GER. OMR6146, GRB. 0945495, JAP. 0377263.
D.233,369.—MICROFILM XEROGRAPHIC MACHINE. OCT. 22, 1974.
D.236,544.—MICROFORM VIEWER. AUG. 26, 1975.

Class 26G

D.225,643.—REACTION TESTING DEVICE. DEC. 26, 1972.
D.225,681.—SUCTION MOUNTING DEVICE. DEC. 26, 1972.
D.226,662.—EDUCATIONAL DEVICE FOR DEMONSTRATING MOMENTUM. APR. 10, 1973.
D.232,030.—EDUCATIONAL AID FOR DEMONSTRATING PRINCIPLES IN PHYSICS. JULY 9, 1974.
D.232,031.—COLLISION DEMONSTRATION TEACHING AID. JULY 9, 1974.
D.232,098.—TEACHING AID FOR DEMONSTRATING PRINCIPLES IN PHYSICS. JULY 16, 1974.
D.232,698.—CLAMP. SEPT. 10, 1974.
D.233,432.—TEACHING AID FOR DEMONSTRATING PRINCIPLES OF PHYSICS. OCT. 29, 1974.
D.233,654.—CONTAINER FOR BOOKLETS OR THE LIKE. NOV. 19, 1974.
D.233,658.—BALANCE SCALE. NOV. 19, 1974.
D.233,935.—EDUCATIONAL DEVICE FOR TEACHING ARITHMETIC. DEC. 17, 1974.
D.234,546.—CARRYING CASE. MAR. 18, 1975.
D.235,440.—EDUCATIONAL PLUG-IN BOARD. JUNE 17, 1975.
D.235,441.—BASIC MEASUREMENT EDUCATIONAL BOARD. JUNE 17, 1975.
D.236,028.—MAGNIFIER. JULY 22, 1975.
D.236,729.—EDUCATIONAL PLUG-ON BOARD. SEPT. 9, 1975.
D.236,730.—EDUCATIONAL PLUG-ON BOARD. SEPT. 9, 1975.
D.236,978.—SWITCHING EDUCATIONAL BOARD. SEPT. 30, 1975.
D.236,979.—EDUCATIONAL MEASURING DEVICE BOARD. SEPT. 30, 1975.
D.237,020.—COMBINED SUPPORT AND STORAGE TRAY FOR AN EDUCATIONAL KIT OR SIMILAR ARTICLE. SEPT. 30, 1975.
D.237,878.—MULTI-METER EDUCATIONAL BOARD. DEC. 2, 1975.

Class 26G 1

D.216,157.—BALANCE SCALE. NOV. 25, 1969. BEL. 0016761, GER. DES5718, GRB. 0942720, ITL. 0138772, JAP. 0337548.

Class 26G 2

D.236,731.—CURCUIT TESTING EDUCATIONAL BOARD. SEPT. 9, 1975.

Class 26H

D.204,319.—HOLLOW CORNER PRISM. APR. 5, 1966.
D.236,556.—CARRYING CASE FOR COLORISTS MATERIALS OR THE LIKE. AUG. 26, 1975.

Class 26H 1

D.215,294.—HOUSING FOR ELECTRONIC APPARATUS. SEPT. 23, 1969. ARG. 0011066, BEL. 0016760, GER. 0005765, ITL. 0138776, MEX. 0010934, PNM. 0001839, VZL. 0000664.
D.215,660.—HOUSING FOR ELECTRONIC APPARATUS. OCT. 21, 1969.
D.234,700.—DISC DRIVE CABINET. APR. 1, 1975.
D.238,494.—CONTROL PANEL FOR DISK FILE. JAN. 20, 1976.
D.238,495.—DISK MEMORY MODULE FRONT PANEL. JAN. 20, 1976.
D.240,632.—CABINET FOR ELECTRONIC EQUIPMENT. JULY 20, 1976.

Class 26H 2

D.221,228.—KEYBOARD FOR A COMPUTER OR THE LIKE. JULY 20, 1971.

Class 26H 3

D.221,229.—SEND/RECEIVE DATA PRINTER TERMINAL. JULY 20, 1971.
D.224,019.—XEND/RECEIVE DATA PRINTER TERMINAL. JUNE 27, 1972.
D.236,129.—INPUT/OUTPUT TERMINAL. JULY 29, 1975.

Class 26H 4

D.212,692.—TELEPHONE ACOUSTIC COUPLER. NOV. 12, 1968. ARG. 0010245, BEL. 0016601, CAN. 2503147, FRA. 0096593. GER. 0005410, GRB. 0939331, MEX. 0010845.
D.224,025.—ACOUSTIC COUPLER. JUNE 27, 1972.

Class 26H 5

D.204,319.—HOLLOW CORNER PRISM. APR. 5, 1966.
D.206,956.—HOLLOW CORNER PRISM. FEB. 14, 1967.
D.237,849.—COOLING RACK. DEC. 2, 1975.

Class 26H 6

D.221,108.—PAPER SHREDDER. JULY 6, 1971. CAN. 0033939.

Class 26H 7

D.221,901.—OVERHEAD PROJECTOR. SEPT. 14, 1971. CAN. 0033920.
D.231,800.—RIBBON CARTRIDGE. JUNE 11, 1974.
D.236,787.—BOOKCASE OR SIMILAR ARTICLE. SEPT. 16, 1975.
D.239,419.—TAPE CASSETTE STORAGE UNIT. MAR. 30, 1976.
D.239,472.—MAGNETIC CARD STORAGE TRAY. APR. 6, 1976.
D.239,531.—COPY HOLDER. APR. 13, 1976.
D.239,872.—CAMERA/PROJECTOR. MAY 11, 1976.
3,831,933.—TAMPER DETECTION AND RECOVERY. AUG. 27, 1974.

Class 26H 1

D.241,446.—SINGLE MAGNETIC CARD CONSOLE UNIT FOR ELECTRONIC TYPING SYSTEM. SEPT. 14, 1976.
D.241,447.—SINGLE MAGNETIC TAPE CONSOLE UNIT FOR ELECTRONIC TYPING SYSTEM. SEPT. 14, 1976.
D.241,448.—DUAL MAGNETIC TAPE CONSOLE UNIT FOR ELECTRONIC TYPING SYSTEM. SEPT. 14, 1976.
D.241,449.—DUAL MAGNETIC CARD CONSOLE UNIT FOR ELECTRONIC TYPING SYSTEM. SEPT. 14, 1976.

Class 27A

3,615,614.—LIGHT DEV DIRCT PRINT SILVER HALIDE EMULSION SENSITIZD W/ COMBINTN OF COPPER, LEAD, BROMIDE AND THIOU. OCT. 26, 1971.
3,660,100.—DIRECT-PRINT LIGHT DEVELOPABLE EMULSION. MAY 2, 1972.
3,725,073.—LIGHT DEVELOPABLE DIRECT WRITING, SILVER HALIDE EMULSIONS CONTAINING GOLD, IODINE, LEAD AND COP. APR. 3, 1973. CAN. 0882613.
3,782,960.—DRCT-PRNT LIGHT-DVLPBL EMULSN CNTAING SILVER HALIDE GRAINS SNSTZD SENSTZD ON THE SURFACES W/SI. JAN. 1, 1974. BEL. 0780680, GRB. 1384081, ITL. 0950280.
3,849,146.—DIRECT-PRINT LIGHT-DEVELOPBL SILVER HALIDE EMULSION CONTAINING CYCLIC DIOXIDE OR SELENONE AS SEN. NOV. 19, 1974.

Class 27B

3,631,232.—APPARATUS FOR SIMULATING THE ELECTRICAL CHARACTERISTICS OF A NETWORK. DEC. 28, 1971. CAN. 0951429, GRB. 1267785.

Class 27C

2,298,997.—PHOTOGRAPHIC FILM. OCT. 13, 1942.
2,317,257.—METHOD OF DYEING PHOTOGRAPHIC SILVER HALIDE EMULSIONS. APR. 20, 1943.
2,320,693.—DUPLEX PHOTOGRAPHIC MATERIAL. JUNE 1, 1943.
2,352,822.—PHOTOGRAPHIC COATING. JULY 4, 1944.
2,653,152.—CYANINE DYE AND PROCESS OF MAKING SAME. SEPT. 22, 1953.
2,827,428.—PHOTOGRAPHIC EMULSION PURIFICATION-IONICS. MAR. 18, 1958.
3,736,133.—TRANSPARENT INK - ABSORBENT LACQUERS. MAY 29, 1973. ARG. 0193996, CAN. 0985583, GRB. 1390137, MEX. 0127276.
3,773,513.—DIMENSIONALLY STABLE PHOTOGRAPHIC PAPER CONTAINING GLASS FIBERS. NOV. 20, 1973.

Class 27D

RE.22,654.—PHOTOGRAPHIC DEVELOPING MACHINE - RE OF 2,347,189-D3946. JULY 3, 1945.
3,393,362.—PROCESS FOR DETECTING IRREGULARITIES IN A METALLIC SURFACE. JULY 16, 1968.

Class 27J

3,915,553.—ELECTROOPTIC COLOR FILTER SYSTEM. OCT. 28, 1975.

Class 30

3,861,911.—IMAGING FIXING METHOD. JAN. 21, 1975.

Class 30A

3,573,904.—COMBINATION OF ELECTROGRAPHY AND MANIFOLD IMAGING. APR. 6, 1971. ARG. 0188621, AUS. 0408972, BEL. 0708975, CAN. 0883746, FRA. 1563782, GER. 1671591, GRB. 1215957, ITL. 0822303, JAP. 0620886, MEX. 0100810, VZL. 0023682.
3,707,368.—MANIFOLD IMAGING PROCESS. DEC. 26, 1972.
3,741,762.—MANIFOLD IMAGING MEMBER AND PROCESS. JUNE 26, 1973. CAN. 0961909, GRB. 1376391.
3,955,975.—MANIFOLD IMAGING MEMBER AND PROCESS EMPLOYING A METAL SOAP. MAY 11, 1976.

Class 30B

3,642,363.—MANIFOLD IMAGING SYSTEM. FEB. 15, 1972. CAN. 0960289, GRB. 1328405, JAP. 0770137.
3,661,454.—COMBINATION OF ELECTROGRAPHY AND MANIFOLD IMAGING. MAY 9, 1972.
3,684,362.—TRANSPARENT ELECTRODE. AUG. 15, 1972. CAN. 0932378, GRB. 1340685, JAP. 0758465.
3,741,641.—MANIFOLD IMAGING APPARATUS. JUNE 26, 1973.
3,748,034.—MANIFOLD IMAGING MACHINE. JULY 24, 1973. BEL. 0777713, CAN. 0948694, FRA. 7200999, GRB. 1376661, ITL. 0946353, SPN. 0398585, SWD. 7200573.
3,761,174.—MANIFOLD WEB HANDLING. SEPT. 25, 1973.
3,768,902.—MANIFOLD IMAGING. OCT. 30, 1973.
3,876,937.—LAYER TRANSFER IMAGING SYSTEM. APR. 8, 1975. CAN. 0933996, GRB. 1282725, JAP. 0726369.
3,963,340.—IMAGING APPARATUS. JUNE 15, 1976.

Class 30C

3,615,393.—MANIFOLD IMAGING PROCESS EMPLOYING STATIC CHARGE FIELD APPLICATION. OCT. 26, 1971. BEL. 0746582, CAN. 0965829, FRA. 7007627, GRB. 1295533, ITL. 0886478, JAP. 0727962.
3,653,892.—MANIFOLD IMAGING PROCESS WHEREIN THE IMAGED ELEMENTS MAY BE RECOMBINED AND REUSED. APR. 4, 1972. CAN. 0916967, GRB. 1320407, JAP. 0731611.
3,676,116.—IMAGE REVERSAL IN MANIFOLD IMAGING USING ELECTRICALLY CONDUCTIVE RECEIVER SHEET. JULY 11, 1972.
3,684,362.—TRANSPARENT ELECTRODE. AUG. 15, 1972. CAN. 0932378, GRB. 1340685, JAP. 0758465.
3,692,516.—MANIFOLD IMAGING METHOD - PHAROS MANIFOLD IMAGING REVERSAL. AUG. 19, 1972. CAN. 0929204, GRB. 1320012, JAP. 0759476.
3,692,518.—MANIFOLD IMAGING PROCESS. SEPT. 19, 1972. ARG. 0191965, BEL. 0749174, CAN. 0916496, FRA. 7013872, GRB. 1309649, ITL. 0899700, JAP. 0731228, MEX. 0116175.
3,718,462.—MANIFOLD ELECTRIFICATION PROCESS. FEB. 27, 1973. CAN. 0947366, GRB. 1313712, JAP. 0739530.
3,737,311.—ELECTROSTATIC PARTICLES TRANSFER IMAGING PROCESS. JUNE 5, 1973.
3,756,812.—MANIFOLD IMAGING PROCESS. SEPT. 4, 1973.
3,761,258.—IMAGING PROCESS EMPLOYING CHARGED DONOR AND RECEIVER SHEETS. SEPT. 25, 1973.
3,776,721.—MANIFOLD IMAGING. DEC. 4, 1973.
3,844,780.—IMAGING PROCESS. OCT. 29, 1974.
3,846,127.—IMAGING SYSTEM. NOV. 5, 1974.
3,850,626.—IMAGING MEMBER AND METHOD. NOV. 26, 1974.
3,854,943.—MANIFOLD IMAGING METH AND MEMBR EMPLOYING FUNDAMENTAL PARTICLES OF ALPHA METAL FREE PHTHALOCYANINE. DEC. 17, 1974. CAN. 0988766, GRB. 1424234.
3,861,910.—MANIFOLD IMAGING PROCESS. JAN. 21, 1975. ARG. 0198477, BEL. 0744343, CAN. 0947363, FRA. 7001127, GRB. 1284521, ITL. 0885940, JAP. 0727960, MEX. 0111440.
3,909,257.—MANIFOLD IMAGING PROCESS WITH SPOOL ELECTRODE. SEPT. 30, 1975.

Class 30D

3,598,581.—MANIFOLD IMAGING METHOD. AUG. 10, 1971. ARG. 0198157, AUS. 0413154, BEL. 0713100, BRA. 6795099, CAN. 0889250, CHL. 0024249, CLB. 0017928, FRA. 1560020, GRB. 1200712, ITL. 0829693, JAP. 0626106, LXB. 0055806, MEX. 0100797, NOR.

0128040, PRU. 0009737, SPN. 0352316, STZ. 0474097, SWD. 0340404, URG. 0009203, VZL. 0023690.

3,723,112.—MANIFOLD IMAGING METHOD WHEREIN THE ACTIVATOR CARRIES A PLASTIC COATING MATERIAL. MAR. 27, 1973.

3,741,762.—MANIFOLD IMAGING MEMBER AND PROCESS. JUNE 26, 1973. CAN. 0961909, GRB. 1376391.

3,907,558.—MANIFOLD IMAGING UTILIZING SILICA GEL ACTIVATING LAYER. SEPT. 23, 1975.

3,912,504.—MANIFOLD IMAGING WITH THERMAL ACTIVATOR CONTAINED IN A SILICA GEL LAYER. OCT. 14, 1975.

3,955,975.—MANIFOLD IMAGING MEMBER AND PROCESS EMPLOYING A METAL SOAP. MAY 11, 1976.

3,964,904.—MANIFOLD IMAGING MEMBER AND PROCESS EMPLOYING A DARK CHARGE INJECTING LAYER. JUNE 22, 1976. BEL. 0832405.

Class 30E

3,653,889.—METHOD OF FIXING MANIFOLD IMAGES. APR. 4, 1972. BEL. 0754024, CAN. 0921745, FRA. 7028279, GRB. 1322772, ITL. 0900939, JAP. 0739529.

3,658,519.—IMAGE TRANSFER PROCESS FROM CONDUCTIVE SUBSTRATES. APR. 25, 1972. ARG. 0195536, AUS. 0456406, BEL. 0760747, BRA. 7022093, CAN. 0960290, FRA. 7047144, GRB. 1337590, ITL. 0913848, MEX. 0119590, SWD. 7017293.

3,706,553.—TRANSFER OF IMAGES TO A NON-CONDUCTIVE SUBSTRATE. DEC. 19, 1972. ARG. 0203811, AUS. 0461437, BEL. 0760456, CAN. 0947368, FRA. 7047140, GRB. 1339577, ITL. 0913634, MEX. 0119591, SWD. 7017139.

3,708,288.—IMAGE TRANSFER PROCESS. JAN. 2, 1973. CAN. 0882053, GRB. 1298922, JAP. 0757867.

3,723,112.—MANIFOLD IMAGING METHOD WHEREIN THE ACTIVATOR CARRIES A PLASTIC COATING MATERIAL. MAR. 27, 1973.

3,746,538.—IMAGE TRANSFER PROCESS. JULY 17, 1973. CAN. 0951781, GRB. 1374841.

3,793,017.—IMAGING FIXING METHOD. FEB. 19, 1974.

3,819,368.—MANIFOLD IMAGING MEMBER EMPLOYING A FIXATIVE LAYER. JUNE 25, 1974.

3,825,423.—IMAGE TRANSFER PROCESS. JULY 23, 1974.

3,888,208.—IMAGE TRANSFER PROCESS. JUNE 10, 1975.

Class 30F

3,548,748.—DUPLICATING METHOD EMPLOYING SIMULTANEOUS APPLICATION OF ELECTRIC FIELD AND EXPOSURE TO RADIATION. DEC. 22, 1970. CAN. 0882051, GRB. 1227394, JAP. 0752522.

3,554,125.—METHOD OF MAKING A LITHOGRAPHIC MASTER AND METHOD OF PRINTING THEREWITH. JAN. 12, 1971. CAN. 0882052, GRB. 1219849.

3,565,612.—DUPLICATING MASTERS BY THE MANIFOLD PROCESS. FEB. 23, 1971. ARG. 0193797, AUS. 0411612, BEL. 0708974, CAN. 0873277, FRA. 1549964, GER. 1671590, GRB. 1215956, ITL. 0823464, MEX. 0106608, VZL. 0023681.

3,573,904.—COMBINATION OF ELECTROGRAPHY AND MANIFOLD IMAGING. APR. 6, 1971. ARG. 0188621, AUS. 0408972, BEL. 0708975, CAN. 0883746, FRA. 1563782, GER. 1671591, GRB. 1215957, ITL. 0822303, JAP. 0620886, MEX. 0100810, VZL. 0023682.

Class 30G

3,655,372.—IMAGE REVERSAL IN MANIFOLD IMAGING. APR. 11, 1972.

3,901,697.—MANIFOLD IMAGING PROCESSUSING ELECTRONICS PHOTOSENSITIVE MATERIAL SUBJECT TO LIGHT FATIGUE. AUG. 26, 1975.

Class 30H

3,649,117.—IMAGING PROCESS. MAR. 14, 1972. BEL. 0761133, CAN. 0985732, FRA. 7047700, GRB. 1340679, ITL. 0914070, JAP. 0759480.

3,918,967.—CONTACT REFLEX MANIFOLD IMAGING PROCESS. NOV. 11, 1975. ARG. 0183676, BEL. 0761132, CAN. 0949120, FRA. 7047699, GRB. 1340207, ITL. 0914069, JAP. 0770143, MEX. 0119757, VZL. 0032600.

Class 30I

3,556,783.—COLOR MANIFOLD IMAGING PROCESS. JAN. 19, 1971.

3,853,555.—METHOD OF COLOR IMAGING A LAYER OF ELECTRICALLY PHOTOSENSITIVE AGGLOMERATES. DEC. 10, 1974.

3,854,943.—MANIFOLD IMAGING METH AND MEMBR EMPLOYING FUNDAMENTAL PARTICLES OF ALPHA METAL FREE PHTHALOCYANINE. DEC. 17, 1974. CAN. 0988766, GRB. 1424234.

Class 31

3,719,951.—WRAP ADJUST DEVICE FOR CONTROLLING ENGAGEMENT BETWEEN A WEB AND ROLLER IN AN IMAGING SYSTEM. MAR. 6, 1973. GRB. 1406047.

Class 31A

3,520,681.—PHOTOELECTROSOLOGRAPHY. JULY 14, 1970. BRA. 0084241, CAN. 0852692, MEX. 0085656.

3,801,314.—IMAGING SYSTEM. APR. 2, 1974.

3,975,195.—MIGRATION IMAGING SYSTEM. AUG. 17, 1976.

Class 31B

3,528,355.—CAMERA-PROCESSOR. SEPT. 15, 1970. ARG. 0184627, ATR. 0303513, AUS. 0426557, BEL. 0720022, BRA. 6800654, CAN. 0864811, CHL. 0024251, CLB. 0018453, FRA. 1586179, GER. 1797177, GRB. 1244641, IND. 0117458, ITL. 0839895, LXB. 0056774, MEX. 0103737, NOR. 0128296, NZL. 0153587, PLP. 0006313, PNM. 0001980, PRU. 0010212, PTG. 0050229, SPN. 0357651, STZ. 0516171, SWD. 0338503, URG. 0009309, VZL. 0023698.

3,542,465.—CAMERA WITH DEVELOPMENT MEANS. NOV. 24, 1970. CAN. 0918739, GRB. 1241846, JAP. 0650672.

3,719,951.—WRAP ADJUST DEVICE FOR CONTROLLING ENGAGEMENT BETWEEN A WEB AND ROLLER IN AN IMAGING SYSTEM. MAR. 6, 1973. GRB. 1406047.

3,770,554.—APPARATUS FOR SPLITTING A SOFTENABLE FILM COMPRISING BITE ROLLERS. NOV. 6, 1973.

3,878,816.—IMAGING SYSTEM. APR. 22, 1975.

3,910,475.—SYSTEM FOR ELECTRICALLY GROUNDING OR BIASING A MEMBER. OCT. 7, 1975.

Class 31C

3,556,781.—MIGRATION IMAGING PROCESS. JAN. 19, 1971. ARG. 0175887, AUS. 0425096, BEL. 0722718, CAN. 0874909, CHL. 0024333, FRA. 1587222, GER. 1804475, GRB. 1250526, GUA. 0002124, ITL. 0855511, MEX. 0103409, PNM. 0001949, PRU. 0010349, SPN. 0359501, STZ. 0506818, SWD. 0340750, URG. 0009365, VZL. 0023713.

3,615,400.—MIGRATION IMAGING SYSTEM EMPLOYING CARBON LAYER BETWEEN SOLVENT SOLUBLE LAYR AND CONDUCTIVE LAYER. OCT. 26, 1971. ATR. 0306509, AUS. 0433959, BEL. 0726279, CAN. 0874906, DNK. 0129015, FRA. 1598889, GRB. 1261360, ITL. 0850165, LXB. 0057703, NOR. 0127265, NZL. 0154928, SAF. 0688514, SPN. 0380191, STZ. 0512755, SWD. 7210413.

3,653,885.—PROCESS OF STABILIZING A MIGRATION IMAGE COMPRISING SELENIUM PARTICLES. APR. 4, 1972. CAN. 0937437.

3,656,990.—ELECTROSOLOGRAPHY. APR. 18, 1972. ARG. 0152723, BRA. 0084169, CAN. 0800550, CHL. 0025766. CLB. 0014944, MEX. 0086246, PNM. 0002518, PRU. 0009465, URG. 0008153, VZL. 0023999.

3,664,834.—MIGRATION IMAGING METHOD EMPLOYING ADHESIVE TRANSFER MEMBER. MAY 23, 1972. CAN. 0890353, GRB. 1291848, JAP. 0726370.

3,713,818.—MIGRATION IMAGING SYSTEM WITH MOLTEN LIQUID DEVELOPMENT. JAN. 30, 1973. CAN. 0933580, GRB. 1358566, USR. 0463275.

3,719,482.—IMAGING SYSTEM. MAR. 6, 1973.

3,720,513.—MIGRATION IMAGING METHOD INVOLVING SOLVENT WASH-AWAY OF UNMIGRATED PARTICLES. MAR. 13, 1973.

3,723,113.—POLYCHROMATIC ELECTROSOLOGRAPHIC. MAR. 27, 1973.

3,740,216.—PHOTOELECTROCOLOGRAPHIC IMAGING EMPLOYING A RELEASABLE IMAGING LAYER. JUNE 19, 1973.

3,741,757.—MIGRATION IMAGE DEVELOPMENT BY SPLITTING OR ABRADING SOFTENABLE LAYER. JUNE 26, 1973. ATR. 0306510, AUS. 0441768, BEL. 0743209, CAN. 0915960, FRA. 6943268, GER. 1961754, GRB. 1297129, ITL. 0879120, JAP. 0725058, PNM. 0001554, SPN. 0374618, SWD. 0358750, VZL. 0032779.

3,753,706.—PHOTOELECTROSOLOGRAPHIC IMAGING METHOD WHEREIN AN ABSORBENT MATERIAL IS USED. AUG. 21, 1973. CAN. 0945796, GRB. 1334141, JAP. 0766711.

3,791,822.—REMOVAL OF BACKGROUND FROM AN IMAGED MIGRATION LAYER. FEB. 12, 1974. ATR. 0306510, AUS. 0441768, BEL. 0743209, CAN. 0915960, FRA. 6943268, GER. 1961754, GRB. 1297129, ITL. 0879120, JAP. 0725058, PNM. 0001554, SPN. 0374618, SWD. 0358750, VZL. 0032779.

3,795,512.—IMAGING SYSTEM. MAR. 5, 1974. ARG. 0188187, ATR. 0301340, AUS. 0429441, BEL. 0725617, BRA. 0088091, CAN. 0883747, DNK. 0131212, FRA. 1599277, GER. 1815217, GRB. 1257189, ITL. 0849328, JAP. 0686721, LXB. 0057585, MEX. 0101986, NOR. 0128084, NZL. 0154842, PTG. 0050858, SAF. 0688365, SPN. 0361650, STZ. 0523523, SWD. 0341128, VZL. 0023715.

3,798,030.—PHOTOELECTROSOLOGRAPHIC IMAGING METHOD UTILIZING POWDER PARTICLES. MAR. 19, 1974.

3,820,984.—PHOTOELECTROSOLOGRAPHIC IMAGING METHOD USING FUSIBLE PARTICLES. JUNE 28, 1974.

3,836,362.—IMAGING METHOD. SEPT. 17, 1974.

3,839,030.—MIGRATION IMAGING PROCESS WITH UNIFORM EXPOSURE BEFORE OR DURING THE SOFTENING STEP. OCT. 1, 1974. BEL. 0715790. CAN. 0890853, FRA. 1572571, GRB. 1234652, ITL. 0834777, JAP. 0620888.

3,839,031.—ELECTRODE DEVELOPMENT MIGRATION IMAGING METHOD. OCT. 1, 1974. ARG. 0184241, AUS. 0456843, BEL. 0755599, CAN. 0947367, FRA. 7032000, GRB. 1326950, ITL. 0907387, JAP. 0766709, MEX. 0120156, SPN. 0383314, SWD. 0369115.

3,840,397.—PARTICLE PLACING SYSTEM. OCT. 8, 1974. ARG. 0175888, ATR. 0300561, AUS. 0427473, BEL. 0724135, CAN. 0868305, DNK. 0126727, FRA. 1593258, GER. 1810079, GRB. 1254448, ITL. 0848025, JAP. 0708364, LXB. 0057367, MEX. 0107468, NOR. 0127216, NZL. 0154542, PNM. 0002048, PTG. 0050687, SAF. 0687633, SPN. 0360458, STZ. 0501251, SWD. 0341724, VZL. 0023710.

3,866,236.—IMAGING PROCESS USING VERTICAL PARTICLE MIGRATION. FEB. 11, 1975. CAN. 0936735, GRB. 1360623.

3,873,309.—IMAGING METHOD USING MIGRATION MATERIAL. MAR. 25, 1975. CAN. 978008, GRB. 1357143.

3,878,816.—IMAGING SYSTEM. APR. 22, 1975.

3,894,869.—A POLYCHROMATIC MIGRATION IMAGING SYSTEM. JULY 15, 1975.

3,901,699.—MIGRATION AND AGGLOMERATION IMAGING METHOD. AUG. 26, 1975.

3,910,475.—SYSTEM FOR ELECTRICALLY GROUNDING OR BIASING A MEMBER. OCT. 7, 1975.

3,912,505.—COLOR IMAGING METHOD EMPLOYING A MONOLAYER OF BEADS. OCT. 14, 1975. ARG. 0179561, AUS. 0426600, BEL. 0723097, CAN. 0890354, CHL. 0024276, FRA. 1587252, GRB. 1248744, GUA. 0002327, ITL. 0845607, JAP. 0731223, MEX. 0107801, PNM. 0001814, PRU. 0010425, SPN. 0377583, STZ. 0526138, SWD. 0351501, URG. 0009366, VZL. 0023708.

3,917,880.—ELECTROPHOTETIC IMAGING SYSTEM. NOV. 4, 1975.

3,918,969.—MIGRATION IMAGING METHOD EMPLOYING A UNIFORM EXPOSURE STEP. NOV. 11, 1975. ARG. 0172557, ATR. 0300565, AUS. 0430615, BEL. 0726282, CAN. 0883748, DNK. 0124046, FRA. 1598888, GER. 1817222, GRB. 1257030, ITL. 0850166, JAP. 0665999, LXB. 0057692, MEX. 0107941, NOR. 0127264, NZL. 0154930. PNM. 0001958, SAF. 0688516, SPN. 0362041, STZ. 050o822, SWD. 0340953, VZL. 0023721.

3,933,491.—IMAGING SYSTEM. JAN. 20, 1976.

3,960,555.—PROCESS-PESO WITH CONDUCTORLESS BASE. JUNE 1, 1976. BRA. 0088021, CAN. 0890858, CHL. 0023981, FRA. 1576403, IND. 0115236, ITL. 0829694, LXB. 0055807, MEX. 0096676, PRU. 0009941, SAF. 68/2105, SPN. 0352317, URG. 0009135, VZL. 0023691.

3,966,465.—MULTIPLE LAYER MIGRATION IMAGING SYSTEM. JUNE 29, 1976. BEL. 0773383, CAN. 0960286, GRB. 1370146, ITL. 0938874.

3,967,959.—MIGRATION IMAGING SYSTEM. JULY 6, 1976.

3,970,453.—IMAGING BY SELECTIVE STRIPPING OUT AREAS OF LAYER. JULY 20, 1976.

Class 31D

3,573,906.—ELECTROPHOTOGRAPHIC PLATE AND PROCESS. APR. 6, 1971. ARG. 0177890, AUS. 0441534, BEL. 0725173, BRA. 0088092, CAN. 0906801, CZC. 0157053, FRA. 1594981, GRB. 1217726, ITL. 0852743, SPN. 0379204, SWD. 0335063, USR. 0448658. VZL. 0029780.

3,615,400.—MIGRATION IMAGING SYSTEM EMPLOYING CARBON LAYER BETWEEN SOLVENT SOLUBLE LAYER AND CONDUCTIVE LAYER. OCT. 26, 1971. ATR. 0306509, AUS. 0433959, BEL. 0726279, CAN. 0874906, DNK. 0129015, FRA. 1598889, GRB. 1261360, ITL. 0850165, LXB. 0057703, NOR. 0127265, NZL. 0154928, SAF. 0688514, SPN. 0380191, STZ. 0512755, SWD. 7210413.

3,740,216.—PHOTOELECTROCOLOGRAPHIC IMAGING EMPLOYING A RELEASABLE IMAGING LAYER. JUNE 19, 1973.

3,740,223.—MIGRATION IMAGING STRUCTURE. JUNE 19, 1973. BRA. 6897135, CAN. 0855151, MEX. 0100800, PNM. 0002192, PRU. 0009484, VZL. 0032425.

3,753,706.—PHOTOELECTROSOLOGRAPHIC IMAGING METHOD WHEREIN AN ABSORBENT MATERIAL IS USED. AUG. 21, 1973. CAN. 0945796, GRB. 1334141, JAP. 0766711.

3,801,314.—IMAGING SYSTEM. APR. 2, 1974.

3,820,984.—PHOTOELECTROSOLOGRAPHIC IMAGING METHOD USING FUSIBLE PARTICLES. JUNE 28, 1974.

3,836,364.—PHOTOELECTROSOLOGRAPHIC PROCESS FOR MAKING MULTIPLE IMAGES. SEPT. 17, 1974. CAN. 0914519, GRB. 1344482, JAP. 0770140.

3,839,031.—ELECTRODE DEVELOPMENT MIGRATION IMAGING METHOD. OCT. 1, 1974. ARG. 0184241, AUS. 0456843. BEL. 0755599, CAN. 0947367, FRA. 7032000, GRB. 1326950, ITL. 0907387, JAP. 0766709, MEX. 0120156, SPN. 0383314, SWD. 0369115.

3,873,309.—IMAGING METHOD USING MIGRATION MATERIAL. MAR. 25, 1975. CAN. 978008, GRB. 1357143.

3,901,702.—MIGRATION IMAGING ELEMENT WITH ABSORBENT BLOTTER OVERLAYER. AUG. 26, 1975. CAN. 0945796, GRB. 1334141, JAP. 0766711.

3,933,491.—IMAGING SYSTEM. JAN. 20, 1976.

3,966,465.—MULTIPLE LAYER MIGRATION IMAGING SYSTEM. JUNE 29, 1976. BEL. 0773383, CAN. 0960286, GRB. 1370146, ITL. 0938874.

3,975,195.—MIGRATION IMAGING SYSTEM. AUG. 17, 1976.

Class 31E

3,598,644.—IMAGING MEMBER FABRICATION. AUG. 10, 1971.

3,671,282.—METHOD OF MAKING AN IMAGING MEMBER. JUNE 20, 1972. BEL. 0755384, FRA. 7031999, GRB. 1326056, ITL. 0901735.

3,971,334.—COATING DEVICE. JULY 27, 1976.

Class 31F

3,520,681.—PHOTOELECTROSOLOGRAPHY. JULY 14, 1970. BRA. 0084241, CAN. 0852692, MEX. 0085656.

3,780,307.—LIQUID CRYSTALLINE COMPOSITIONS HAVING INDUCED OPTICAL ACTIVITY. DEC. 18, 1973. GRB. 1408059.

3,909,262.—IMAGING MIGRATION MEMBER EMPLOYING A GELATIN OVERCOATING. SEPT. 30, 1975.

3,933,491.—IMAGING SYSTEM. JAN. 20, 1976.

3,966,465.—MULTIPLE LAYER MIGRATION IMAGING SYSTEM. JUNE 29, 1976. BEL. 0773383, CAN. 0960286, GRB. 1370146, ITL. 0938874.

Class 31G

3,664,834.—MIGRATION IMAGING METHOD EMPLOYING ADHESIVE TRANSFER MEMBER. MAY 23, 1972. CAN. 0890353, GRB. 1291848, JAP. 0726370.

3,723,113.—POLYCHROMATIC ELECTROSOLOGRAPHIC. MAR. 27, 1973.

3,740,216.—PHOTOELECTROCOLOGRAPHIC IMAGING EMPLOYING A RELEASABLE IMAGING LAYER. JUNE 19, 1973.

3,741,757.—MIGRATION IMAGE DEVELOPMENT BY SPLITTING OR ABRADING SOFTENABLE LAYER. JUNE 26, 1973. ATR. 0306510, AUS. 0441768, BEL. 0743209, CAN. 0915960, FRA. 6943268, GER. 1961754, GRB. 1297129, ITL. 0879120, JAP. 0725058, PNM. 0001554, SPN. 0374618, SWD. 0358750, VZL. 0032779.

3,741,758.—MIGRATION IMAGING EMPLOYING PRESSURE NIP DEVELOPMENT. JUNE 26, 1973.

3,753,706.—PHOTOELECTROSOLOGRAPHIC IMAGING METHOD WHEREIN AN ABSORBENT MATERIAL IS USED. AUG. 21, 1973. CAN. 0945796, GRB. 1334141. JAP. 0766711.

3,770,554.—APPARATUS FOR SPLITTING A SOFTENABLE FILM COMPRISING BITE ROLLERS. NOV. 6, 1973.

3,791,822.—REMOVAL OF BACKGROUND FROM AN IMAGED MIGRATION LAYER. FEB. 12, 1974. ATR. 0306510, AUS. 0441768, BEL. 0743209, CAN. 0915960, FRA. 6943268, GER. 1961754, GRB. 1297129, ITL. 0879120, JAP. 0725058, PNM. 0001554, SPN. 0374618, SWD. 0358750, VZL. 0032779.

3,836,364.—PHOTOELECTROSOLOGRAPHIC PROCESS FOR MAKING MULTIPLE IMAGES. SEPT. 17, 1974. CAN. 0914519, GRB. 1344482, JAP. 0770140.

3,876,445.—MIGRATION IMAGING BY SPLITTING A SOFTENABLE MATERIAL. APR. 8, 1975. ATR. 0306510, AUS. 0441768, BEL. 0743209, CAN. 0915960, FRA. 6943268, GER. 1961754, GRB. 1297129, ITL. 0879120, JAP. 0725058, PNM. 0001554, SPN. 0374618, SWD. 0358750, VZL. 0032779.

Class 31H

3,795,512.—IMAGING SYSTEM. MAR. 5, 1974. ARG. 0188187, ATR. 0301340, AUS. 0429441, BEL. 0725617, BRA. 0088091, CAN. 0883747, DNK. 0131212, FRA. 1599277. GER. 1815217, GRB. 1257189, ITL. 0849328, JAP. 0686721, LXB. 0057585, MEX. 0101986, NOR. 0128084, NZL. 0154842, PTG. 0050858, SAF. 0688365, SPN. 0361650, STZ. 0523523, SWD. 0341128, VZL. 0023715.

3,839,031.—ELECTRODE DEVELOPMENT MIGRATION IMAGING METHOD. OCT. 1, 1974. ARG. 0184241, AUS. 0456843, BEL. 0755599, CAN. 0947367, FRA. 7032000, GRB. 1326950, ITL. 0907387, JAP. 0766709, MEX. 0120156, SPN. 0383314, SWD. 0369115.

Class 31I

3,861,911.—IMAGING FIXING METHOD. JAN. 21, 1975.

Class 31J

3,648,607.—IMAGING SYSTEM-MASTER MAKING BY BINDER PESO. MAR. 14, 1972. CAN. 0920410, GRB. 1322946, JAP. 0770136.

3,664,834.—MIGRATION IMAGING METHOD EMPLOYING ADHESIVE TRANSFER MEMBER. MAY 23, 1972. CAN. 0890353, GRB. 1291848, JAP. 0726370.

3,723,113.—POLYCHROMATIC ELECTROSOLOGRAPHIC. MAR. 27, 1973.

3,740,216.—PHOTOELECTROCOLOGRAPHIC IMAGING EMPLOYING A RELEASABLE IMAGING LAYER. JUNE 19, 1973.

3,820,984.—PHOTOELECTROSOLOGRAPHIC IMAGING METHOD USING FUSIBLE PARTICLES. JUNE 28, 1974.

3,923,504.—MIGRATION IMAGING MEMBER AND METHOD. DEC. 2, 1975.

Class 31K

3,873,309.—IMAGING METHOD USING MIGRATION MATERIAL. MAR. 25, 1975. CAN. 978008, GRB. 1357143.

3,894,869.—A POLYCHROMATIC MIGRATION IMAGING SYSTEM. JULY 15, 1975.

3,912,505.—COLOR IMAGING METHOD EMPLOYING A MONOLAYER OF BEADS. OCT. 14, 1975. ARG. 0179561, AUS. 0426600, BEL. 0723097, CAN. 0890354, CHL. 0024276, FRA. 1587252, GRB. 1248744, GUA. 0002327, ITL. 0845607, JAP. 0731223, MEX. 0107801, PNM. 0001814, PRU. 0010425, SPN. 0377583, STZ. 0526138, SWD. 0351501, URG. 0009366, VZL. 0023708.

3,966,465.—MULTIPLE LAYER MIGRATION IMAGING SYSTEM. JUNE 29, 1976. BEL. 0773383, CAN. 0960286, GRB. 1370146, ITL. 0938874.

Class 31L

3,615,394.—METHOD OF FORMING A PIGMENT IMAGE FROM A PIGMENT-RESIN TONER IMAGE. OCT. 26, 1971.

3,615,400.—MIGRATION IMAGING SYSTEM EMPLOYING CARBON LAYER BETWEEN SOLVENT SOLUBLE LAYER AND CONDUCTIVE LAYER. OCT. 26, 1971. ATR. 0306509, AUS. 0433959, BEL. 0726279, CAN. 0874906, DNK. 0129015, FRA. 1598889, GRB. 1261360. ITL. 0850165, LXB. 0057703, NOR. 0127265, NZL. 0154928, SAF. 0688514, SPN. 0380191, STZ. 0512755, SWD. 7210413.

Class 32

3,719,951.—WRAP ADJUST DEVICE FOR CONTROLLING ENGAGEMENT BETWEEN A WEB AND ROLLER IN AN IMAGING SYSTEM. MAR. 6, 1973. GRB. 1406047.

3,746,622.—COMPOSITION AND PROCESS. JULY 17, 1973. BEL. 0783439, CAN. 0986046, GRB. 1388725, ITL. 0965051, SAF. 7213163.

3,774,592.—METHOD FOR PROVIDING AN IMPROVED BODY ELECTRODE ELECTRICAL CONNECTION. NOV. 27, 1973.

3,884,685.—LOW DENSITY PAPER USED IN TRANSFER ELECTROPHOTOGRAPHY. MAY 20, 1975. ARG. 0185573, ATR. 0314353, AUS. 0463544, BEL. 0768990, CAN. 9780051, CHL. 0027015, FRA. 7124553, GRB. 1353372, ITL. 0931092, NZL. 0164088, PNM. 0002462, SPN. 0392720, SWD. 0368995.

3,891,990.—IMAGING PROCESS USING DONOR MATERIAL. JUNE 24, 1975.

3,946,172.—A LATCHING APPARATUS. MAR. 23, 1976. GRB. 1429530.

3,946,401.—ELECTROTHERMOGRAPHIC IMAGE PRODUCING TECHNIQUES. MAR. 23, 1976.

3,952,798.—INTERNALLY HEATED HEAT PIPE ROLLER-INTERNALLY HEATED HEAT PIPE. APR. 27, 1976. CAN. 0968341. GRB. 1368100.

3,971,950.—INDEPENDENT COMPRESSION AND POSITIONING DEVICE FOR USE IN MAMMOGRAPHY. JULY 27, 1976.

3,975,681.—ELECTRODE FOR MEASURING THICKNESS OF DIELECTRIC LAYERS ON CONDUCTIVE SUBSTRATES. AUG. 17, 1976.

Class 32A

3,132,972.—ENERGY CONVERSION CELL. MAY 12, 1964.

3,231,426.—CONTINUOUS CONCENTRATION CELL. JAN. 25, 1966.

3,379,527.—PHOTOCONDUCTIVE INSULATORS COMPRISING ACTIVATED SULFIDES SELENIDES AND SULFOSELENIDES OF CADMIUM. APR. 23, 1968. CAN. 0907921, GRB. 1079065.

Class 32B

3,150,446.—BRAZING METHOD AND COMPOSITION. SEPT. 29, 1964.

3,354,644.—LIQUID PROTECTION OF ELECTRODES. NOV. 28, 1967.

3,372,860.—CORRESPONDENCE PIECE. MAR. 12, 1968.

3,453,752.—ANSWER COMPARISON DEVICE. JULY 8, 1969.

3,483,777.—INFORMATION STORAGE AND RETRIEVAL EMPLOYING THERMAL PERFORATION OF THE RECORD MEMBER. DEC. 16, 1969. CAN. 0811566.

3,507,333.—FIRE PREVENTION SYSTEM. APR. 21, 1970. BEL. 0722599, CAN. 0910255, FRA. 1589864, GRB. 1229495, ITL. 0845253, JAP. 0752504.

3,510,210.—COMPUTER PROCESS CHARACTER ANIMATION. MAY 5, 1970.

3,552,562.—RANDOM ACCESS RETRIEVAL SYSTEM. JAN. 5, 1971.

3,577,203.—CHARACTER RECORDING AND RECOGNITION SYS. MAY 4, 1971.

3,635,789.—DRINKING OF WASTE XEROGRAPHIC COPY PAPER - REMOVAL OF XEROX TONER FROM COPY PAPER. JAN. 18, 1972.

3,645,048.—ERASER FOR VELLUM XEROGRAPHIC COPY PAPER. FEB. 29, 1972. AUS. 0449216, CAN. 0933707, GRB. 1329835.

3,647,713.—NONAGGLOMERATING BLENDING PROCESS. MAR. 7, 1972. FRA. 7004722, GRB. 1302409, JAP. 0661186.

3,648,387.—EDUCATIONAL AID. MAR. 14, 1972.

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3,708,287.—OIL FILM IMAGING. JAN. 2, 1973.

3,713,861.—INHIBITOR DEVICE. JAN. 30, 1973. CAN. 0917701, GRB. 1338893, JAP. 0727989.

3,748,090.—EVAPORATION CRUCIBLE. JULY 24, 1973.

3,771,084.—MAGNETIC RETRIEVAL DEVICE. NOV. 6, 1973.

3,772,173.—ELECTROCONDUCTIVE PAPER. NOV. 13, 1973. CAN. 0930693.

3,793,016.—ELECTROPHOTOGRAPHIC SHEET BINDING PROCESS. FEB. 19, 1974.

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3,812,905.—DYNAMIC BARRIER FOR HEAT PIPE. MAY 28, 1974.

3,842,273.—CORONA GENERATOR CLEANING APPARATUS. OCT. 15, 1974. BEL. 0817485.
3,845,739.—SYSTEM FOR VAPOR DEPOSITION OF THIN FILMS. NOV. 5, 1974. BEL. 0798324, GRB. 1428703.
3,861,202.—METHOD OF DETECTING PRESSURE UNIFORMITY. JAN. 21, 1975.
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3,869,910.—DIAGNOSTIC TEST DEVICE FOR DEVELOPER MATERIALS. MAR. 11, 1975. FRA. 7421111.
3,873,813.—CREDIT CARD. MAR. 25, 1975.
3,877,155.—RESPONSIVE ANSWER SYSTEM. APR. 15, 1975. CAN. 0858780, GRB. 1235941, JAP. 0688426.
3,879,275.—POLYMERIZATION. APR. 22, 1975.
3,901,591.—MECHANISM FOR COOLING PHOTOSENSITIVE MATERIALS IN AN ELECTROPHOTOGRAPHIC COPYING MACHINE. AUG. 26, 1975.
3,918,337.—CUTTING DEVICE FOR ELASTOMERIC SHEET MATERIAL. NOV. 11, 1975.
3,923,512.—IMAGING RECORDING PROCESS. DEC. 2, 1975. GRB. 1387177.
3,929,477.—IMAGE PRODUCING TECHNIQUES OF SUPERCONDUCTING MATERIAL IN A MAGNETIC FIELD. DEC. 30, 1975.
3,944,710.—TRANSPARENCY. MAR. 16, 1976.
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3,970,186.—DAMPER FOR A COMPOSITE PRINT WHEEL. JULY 20, 1976. BEL. 0825110.

PATENT NOTICES

Certificates of Correction for the Week of Nov. 23, 1976

P.P. 3,860	3,949,462	3,969,678	3,976,821
Re. 28,618	3,950,360	3,969,779	3,976,833
D. 237,592	3,953,723	3,970,077	3,976,841
D. 240,819	3,955,122	3,970,411	3,976,987
D. 240,988	3,955,466	3,970,542	3,977,047
3,689,129	3,955,595	3,970,892	3,977,206
3,737,778	3,955,935	3,971,011	3,977,375
3,757,743	3,956,194	3,971,030	3,977,461
3,813,265	3,956,243	3,971,300	3,977,760
3,820,307	3,956,797	3,971,650	3,977,802
3,821,277	3,957,529	3,971,660	3,977,906
3,832,388	3,957,806	3,971,675	3,977,985
3,836,658	3,958,235	3,971,767	3,977,996
3,842,701	3,958,656	3,971,837	3,978,169
3,858,753	3,959,100	3,971,901	3,978,244
3,861,921	3,960,610	3,971,914	3,978,274
3,864,276	3,961,841	3,972,002	3,978,546
3,893,618	3,962,486	3,972,349	3,978,802
3,898,264	3,962,635	3,972,491	3,978,835
3,912,482	3,962,716	3,972,608	3,978,930
3,912,558	3,962,909	3,972,870	3,978,976
3,912,757	3,963,721	3,973,055	3,979,243
3,912,921	3,963,862	3,973,089	3,979,551
3,916,033	3,963,924	3,973,490	3,979,649
3,916,744	3,964,551	3,973,551	3,979,677
3,919,913	3,964,868	3,973,576	3,979,797
3,919,976	3,965,463	3,973,752	3,979,854
3,925,174	3,965,465	3,974,090	3,979,895
3,926,609	3,965,479	3,974,128	3,980,025
3,929,869	3,965,570	3,974,313	3,980,112
3,930,545	3,965,582	3,974,529	3,980,162
3,932,791	3,966,762	3,974,711	3,980,267
3,934,566	3,966,862	3,975,189	3,980,629
3,934,968	3,966,891	3,975,346	3,980,826
3,935,322	3,967,008	3,975,403	3,980,904
3,941,967	3,967,249	3,975,473	3,980,961
3,942,089	3,967,285	3,975,785	3,981,164
3,943,210	3,967,629	3,975,893	3,981,408
3,943,423	3,967,752	3,976,033	3,981,517
3,943,838	3,968,180	3,976,373	3,981,767
3,945,835	3,968,441	3,976,431	3,981,777
3,946,657	3,968,460	3,976,447	3,982,041
3,947,655	3,969,326	3,976,489	3,982,170
3,947,966	3,969,380	3,976,552	3,982,213
3,948,483	3,969,381	3,976,606	
3,948,680	3,969,560	3,976,612	

Dedication

3,624,445.—*Ralph L. Cadwallader,* Concord, Mass. ELECTRIC SYSTEM FOR FIRING A GASEOUS DISCHARGE DEVICE. Patent dated Nov. 30, 1971. Dedication filed Nov. 23, 1973, by the assignee, *EG & G,* Inc.

Hereby dedicates to the Public the entire term of said patent.

Disclaimers

3,408,025.—*Burt L. Davis,* Palo Alto, Calif. EMERGENCY EVACUATION SYSTEM. Patent dated Oct. 29, 1968. Disclaimer filed Sept. 20, 1976, by the inventor.

Hereby enters this disclaimer to claims 1, 2, 3, 4, 5, 6 and 7 of said patent.

3,490,882.—*William P. Dunworth,* Wilmington, Del. STABILIZED DISTILLATE FUEL OILS AND ADDITIVE COMPOSITIONS THEREFOR. Patent dated Jan. 20, 1970. Disclaimer filed Sept. 17, 1976, by the assignee, *E. I. du Pont de Nemours and Company.*

The term of this patent subsequent to June 1, 1982, has been disclaimed.

3,668,475.—*Raymond Clyde Owens,* Carmel, and *Lucius Ponder Thomas,* Indianapolis, Ind. KINESCOPE SOCKET. Patent dated June 6, 1972. Disclaimer filed Sept. 23, 1976, by the assignee, *RCA Corporation.*

Hereby enters this disclaimer to claims 12, 13 and 15 of said patent.

3,790,853.—*Jacques Isaac Pankove,* Princeton, N.J. SEMICONDUCTOR LIGHT RAY DEFLECTOR. Patent dated Feb. 5, 1974. Disclaimer filed Sept. 7, 1976, by the assignee, *RCA Corporation.*

Hereby enters disclaimer to Claims 1, 2, 4 and 7 of said patent.

3,794,844.—*John O. Dimmock,* Acton, *Ivars Melngailis,* Sudbury, and *Alan J. Strauss,* Lexington, Mass. METHOD AND MEANS OF CONSTRUCTION OF A SEMICONDUCTOR MATERIAL FOR USE IN A LASER. Patent dated Feb. 26, 1974. Disclaimer filed Sept. 17, 1976, by the assignee, *Massachusetts Institute of Technology.*

The term of this patent subsequent to July 24, 1990, has been disclaimed.

3,856,503.—*Tony Cebalo,* Indianapolis, Ind. HERBICIDAL METHOD AND COMPOSITIONS. Patent dated Dec. 24, 1974. Disclaimer filed Sept. 20, 1976, by the assignee, *Air Products and Chemicals, Inc.*

Hereby enters this disclaimer to claim 3 of said patent.

3,861,933.—*Tadashi Doi,* Osaka, Japan. ASPHALT HAVING HIGH ADHESION STRENGTH AND ITS PREPARATION. Patent dated Jan. 21, 1975. Disclaimer filed Sept. 21, 1976, by the assignee, *Kao Soap Co., Ltd.*

Hereby enters this disclaimer to claims 1, 2 and 3 of said patent.

3,868,712.—*Conrad H. Biber,* Needham, Mass. PNEUMATICALLY REACTIVE EXPOSURE CONTROL SYSTEM. Patent dated Feb. 25, 1975. Disclaimer filed Sept. 23, 1976, by the assignee, *Polaroid Corporation.*

Hereby enters this disclaimer to claim 6 of said patent.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

WILLIAM FELDMAN, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF OCTOBER 23, 1976

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL CHEMISTRY AND PETROLEUM CHEMISTRY, GROUP 110—S. N. ZAHARNA, Director. Inorganic Compounds; Inorganic Compositions; Organo-Metal and Organo-Metalloid Chemistry; Metallurgy; Metal Stock; Electro Chemistry; Batteries; Hydrocarbons; Mineral Oil Technology; Lubricating Compositions; Gaseous Compositions; Fuel and Igniting Devices.	1-28-76
GENERAL ORGANIC CHEMISTRY, GROUP 120—A. L. LEAVITT, Director. Heterocyclic, Amides; Alkaloids; Azo; Sulfur; Misc. Esters; Carbohydrates; Herbicides; Poisons; Medicines; Cosmetics; Steroids; Oxo and Oxy; Quinones; Acids; Carboxylic Acid Esters; Acid Anhydrides; Acid Halides.	3-18-76
HIGH POLYMER CHEMISTRY, PLASTICS AND MOLDING, GROUP 140—A. P. KENT, Director. Synthetic Resins; Rubber; Proteins; Macromolecular Carbohydrates; Mixed Synthetic Resin Compositions; Synthetic Resins With Natural Polymers and Resins; Natural Resins; Reclaiming; Pore-Forming; Compositions (Part) e.g.: Coating; Molding; Ink; Adhesive and Abrading Compositions; Molding, Shaping, and Treating Processes.	10-20-75
COATING AND LAMINATING, BLEACHING, DYEING AND PHOTOGRAPHY, GROUP 160—R. FRIEDMAN, Director. Coating; Processes and Misc. Products; Laminating Methods and Apparatus; Stock Materials; Adhesive Bonding; Special Chemical Manufactures; Special Utility Compositions; Bleaching; Dyeing and Photography.	1-26-76
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 170—H. S. VINCENT, Director. Fertilizers; Foods; Fermentation; Analytical Chemistry; Reactors; Sugar and Starch; Paper Making; Glass Manufacture; Gas; Heating and Illuminating; Cleaning Processes; Liquid Purification; Distillation; Preserving; Liquid, Gas, and Solid Separation; Gas and Liquid Contact Apparatus; Refrigeration; Concentrative Evaporators; Mineral Oils Apparatus; Misc. Physical Processes.	1-8-76
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—W. L. CARLSON, Director. Generation and Utilization; General Applications; Conversion and Distribution; Heating and Related Art Conductors; Switches; Photography; Motion Pictures; Illumination; Horology; Acoustics; Recorders; Weighing Scales.	8-12-75
SPECIAL LAWS ADMINISTRATION, GROUP 220—C. D. QUARFORTH, Director. Ordnance, Firearms and Ammunition; Radar, Underwater Signalling, Directional Radio, Torpedoes, Seismic Exploring, Radio-Active Batteries; Nuclear Reactors, Powder Metallurgy, Rocket Fuels; Radio-Active Material.	2-2-76
INFORMATION TRANSMISSION, STORAGE AND RETRIEVAL, GROUP 230—J. F. COUCH, Director. Communications; Multiplexing Techniques; Facsimile; Data Processing, Computation and Conversion; Storage Devices and Related Arts.	12-2-75
RECEPTACLES, SANITATION AND CLEANING, WINDING, AND MEASURING, GROUP 240—N. ANSHER, Director. Receptacles; Joint Packing; Conduits; Plumbing Fixtures; Textile Spinning; Food; Agitating; Cleaning; Pressing; Geometrical Instruments; Sound Recording; Winding and Reeling; Measuring and Testing; Indicating.	4-23-76
ELECTRONIC COMPONENT SYSTEMS AND DEVICES, GROUP 250—L. FORMAN, Director. Semi-Conductor and Space Discharge Systems and Devices; Electronic Component Circuits; Wave Transmission Lines and Networks; Optics; Radiant Energy; Measuring.	1-2-76
DESIGNS, GROUP 290—C. D. QUARFORTH, Director. Industrial Arts; Household, Personal and Fine Arts.	6-2-75
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—D. J. STOCKING, Director. Conveyors; Hoists; Elevators; Article Handling Implements; Store Service; Sheet and Web Feeding; Dispensing; Fluid Sprinkling; Fire Extinguishers; Coin Handling; Check Controlled Apparatus; Classifying and Assorting Solids; Boats; Ships; Aeronautics; Motor and Land Vehicles and Appurtenances; Brakes; Railways and Railway Equipment.	1-22-76
MATERIAL SHAPING, ARTICLE MANUFACTURING, TOOLS, GROUP 320—S. S. MATTHEWS, Director. Manufacturing Processes, Assembling, Combined Machines, Special Article Making; Metal Deforming; Sheet Metal and Wire Working; Metal Fusion—Bonding, Metal Founding; Metallurgical Apparatus: Plastics Working Apparatus; Plastic Block and Earthenware Apparatus: Machine Tools for Shaping or Dividing; Work and Tool Holders, Woodworking; Tools; Cutlery; Jacks.	5-3-76
AMUSEMENT, HUSBANDRY, PERSONAL TREATMENT, INFORMATION, GROUP 330—G. M. FORLENZA, Director. Amusement and Exercising Devices; Projectors; Animal and Plant Husbandry; Butchering; Earth Working and Excavating; Fishing, etc.; Tobacco; Artificial Body Members; Dentistry; Jewelry; Surgery; Toiletry; Printing; Typewriters; Stationery; Information Dissemination.	3-1-76
HEAT, POWER, AND FLUID ENGINEERING, GROUP 340—B. R. GAY, Director. Power Plants; Combustion Engines; Fluid Motors; Reaction Motors; Pumps; Rotary Engines and Pumps; Heat Generation and Exchange; Refrigeration; Ventilation; Drying; Temperature and Humidity Regulation; Machine Elements; Couplings; Gearing; Bearings; Clutches; Power Transmission; Fluid Handling and Control; Lubrication.	12-22-75
GENERAL CONSTRUCTIONS, TEXTILES AND MINING, GROUP 350—M. M. NEWMAN, Director. Joints; Fasteners; Rod, Pipe and Electrical Connectors; Miscellaneous Hardware; Locks; Building Structures; Closure Operators; Bridges; Closures; Earth Engineering; Drilling; Mining; Furniture; Supports; Cabinet Structures; Centrifugal Separations; Coating; Textiles; Apparel and Shoes; Sewing Machines.	3-18-76

Expiration of patents: The patents within the range of numbers indicated below expire during November 1976, except those which may have expired earlier due to shortened terms under the provisions of Public Law 690, 79th Congress, approved August 8, 1946 (60 Stat. 940) and Public Law 619, 83rd Congress, approved August 23, 1954 (68 Stat. 764), or which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents..... Numbers 2,910,697 to 2,914,767, inclusive
Plant Patents..... Numbers 1,876 to 1,881, inclusive

REISSUES

NOVEMBER 23, 1976

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

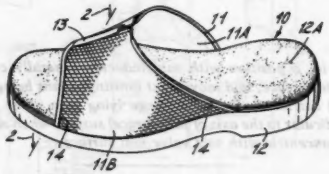
Re. 29,041
FOOTWEAR

Tatsuo Fukuoka, No. 3, 3-Ban, 2-chome, Shin-Minami-Fukushima, Tokushima, Japan

Original No. 3,672,078, dated June 27, 1972, Ser. No. 49,042, June 23, 1970. Application for reissue June 20, 1974, Ser. No. 481,200

Int. Cl.² A43G 3/12

U.S. Cl. 36—11.5 **7 Claims**



1. A footwear comprising a molded thermoplastic sole having a pair of sides and an upper member having a pair of sections of flexible material, one of the sections of the upper member extending into the sole along one side thereof and being secured within the molded sole, the other section of the upper extending into the sole along the other side thereof and being secured within the molded sole, the sections extending upwardly from opposite sides of the sole and toward each other to form a band member, each of the sections having an edge adjacent an edge of the other section, a cover member extending along the inner surfaces of the sections and being spaced from the sections adjacent the adjacent edges thereof, each pair of adjacent edges of the sections being secured by a molded thermoplastic connecting strip surrounding the adjacent edges and extending therebetween and filling the space between the cover member and the sections and securing the cover member to the sections.

Re. 29,042
APPARATUS FOR BUILDING A TOBACCO STREAM

Harry David, Hamburg, Germany, assignor to Hauni-Werke Korber & Co. KG, Hamburg, Germany

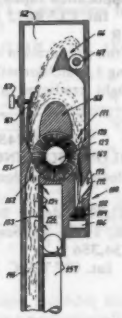
Original No. 3,871,385, dated Mar. 18, 1975, Ser. No. 322,198, Jan. 9, 1973. Application for reissue Feb. 5, 1976, Ser. No. 655,549

Claims priority, application Germany, Jan. 26, 1972, 2203454; July 5, 1972, 2232856

Int. Cl.² A24C 5/39

U.S. Cl. 131—84 B **22 Claims**

1. In a machine for the making of tobacco filler rods, apparatus for building a tobacco stream comprising a source of comminuted tobacco; a tobacco feeding unit arranged to draw tobacco from said source and including a first conveyor operable at a plurality of speeds to transport the withdrawn tobacco along a first portion of a predetermined path; a tobacco stream transporting second conveyor adjacent to means defining a relatively narrow second portion of said path; an accelerating device comprising a rotary conveyor and wall means defining with said rotary conveyor a funnel which receives tobacco supplied by said first conveyor, said accelerating device being disposed between said *first and second* conveyors and operative to mechanically accelerate comminuted tobacco for transfer into and densification in said narrow second portion of said path wherein the accelerated tobacco forms a narrow growing stream which is transported by said second



conveyor; and means for operating said accelerating device independently of at least one of said *first and second* conveyors.

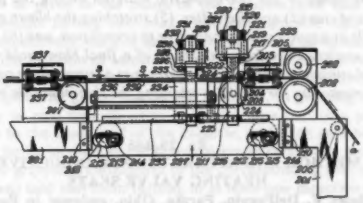
Re. 29,043
METHOD AND APPARATUS FOR MANUFACTURING SYNTHETIC RESIN BAGS HAVING OCCLUDENT MEANS IN THE INSIDE SURFACE THEREOF

Kakuji Naito, Tokyo, Japan, assignor to Kabushiki Kaisha Seisan Nihon Sha, Tokyo, Japan

Original No. 3,506,517, dated Apr. 14, 1970, Ser. No. 641,387, Dec. 2, 1966. Division of Ser. No. 89,540, Feb. 15, 1961, abandoned. Application for reissue Sept. 30, 1975, Ser. No. 618,143

Int. Cl.² B32B 31/02

U.S. Cl. 156—244 **5 Claims**



1. An apparatus for manufacturing synthetic resin bags provided with occludent means, said apparatus being provided with cutting and heat sealing means, comprising a machine frame, delivery rolls at one end of said frame for delivering forth a tubular bag body material provided with occludent means and of flat and belt-like shape, an endless conveyor belt mounted forward of said delivery rolls, the travel of said conveyor belt being at a greater speed than the peripheral speed of said delivery rolls, an electrothermic type blade capable of making up-and-down movements in cycles disposed above that section at which said bag body material is transferred to said conveyor belt and in succession to said blade a pressure plate provided to make similar up-and-down movements as said blade.

Re. 29,044

METHOD FOR THE PREPARATION OF ACETYL CHLORIDE

Koji Konno, Iwaki, and Katuhiro Kobayashi, Kita-ibaragi,, Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Original No. 3,894,921, dated July 15, 1975, Ser. No. 389,311, Aug. 17, 1973. Application for reissue Mar. 1, 1976, Ser. No. 662,447

Claims priority, application Japan, Aug. 19, 1972, 47-83222

Int. Cl.² B01J *1/10*

U.S. Cl. 204—163 R **6 Claims**

1. A method for the preparation of acetyl chloride characterized by interacting 1,1-dichloroethane and chlorine gas and oxygen gas under light irradiated conditions.

Re. 29,045

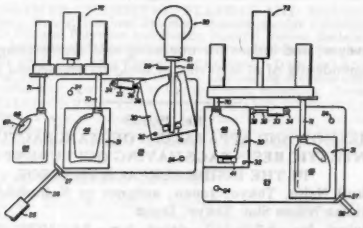
METHOD FOR BLOW MOLDING PLASTIC ARTICLES

Albert R. Uhlig, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Original No. 3,781,395, dated Dec. 25, 1973, Ser. No. 110,685, Jan. 28, 1971. Application for reissue Dec. 19, 1974, Ser. No. 534,356

Int. Cl.² B29C *17/07*

U.S. Cl. 264—89 **12 Claims**



9. In the method of blow molding a container from a thermoplastic material, the steps of sequentially (1) extruding a tubular parison, (2) pinching the parison shut, (3) blowing the pinched parison internally of a pre-form mold into a pre-form, (4) bringing the pre-form to a temperature within the orientation temperature range of the thermoplastic material during the performance of step (3) and thereafter, (5) stretching the blown pre-form while at a temperature conducive to orientation, and (6) blowing the stretched pre-form internally of a final blow mold into the final container while said pre-form is at a temperature conducive to orientation for biaxially orienting the thermoplastic material.

Re. 29,046

METHOD AND APPARATUS FOR INDUCTIVELY HEATING VALVE SEATS

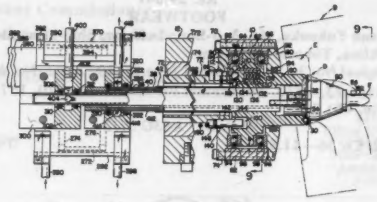
Anthony F. DelPaggio, Parma, Ohio, assignor to Park-Ohio Industries, Inc., Cleveland, Ohio

Original No. 3,743,809, dated July 3, 1973, Ser. No. 151,493, June 9, 1971. Application for reissue June 19, 1975, Ser. No. 588,243

Int. Cl.² H05B *5/00*

U.S. Cl. 219—10.57 **17 Claims**

17. An induction heating device for heating the conical surface of a valve seat of an engine component preparatory to quench hardening, said engine component having a structural element fixed with respect to the center of said conical surface, said device comprising: an inductor having a shape generally matching said conical surface and two input leads for energizing said inductor; a carrier means for supporting said inductor; means for mounting said carrier means with respect to said valve seat, said mounting means including means for limiting radial movement of said carrier means to a selected direction for maintaining a uniform spacing between said valve seat surface and said inductor when said carrier means shifts radially of said valve seat into a concentric relationship with said valve seat surface; and means on said carrier to coact with said structural element of said component for shifting to, and holding said



carrier in, a position with said inductor generally concentric with said surface, said movement limiting means being a flange on said carrier means, said flange lying in a plane generally perpendicular to the axis of said conical surface when said inductor is concentric with said valve seat surface.

Re. 29,047

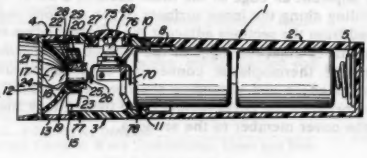
PUSH BUTTON SWITCHING MODULE FOR FLASHLIGHTS

Robert E. Brindley, New York, N.Y., assignor to Union Carbide Corporation, New York, N.Y.

Original No. 3,798,440, dated Mar. 19, 1974, Ser. No. 343,687, Mar. 22, 1973. Application for reissue Sept. 29, 1975, Ser. No. 617,587

Int. Cl.² F21L *7/00*

U.S. Cl. 240—10.66 **6 Claims**



13. A waterproof flashlight comprising a battery casing provided with a front open end adapted to receive at least one battery and having contact means for electrically connecting the bottom vicinity of said battery casing to the vicinity of the front open end; a lens and reflector unit having a front open end and including a lens, a lens ring, a lamp holder containing contact means, and a lamp mounted therein; a switching module adapted at one end to be detachably mounted and watertightly sealed to the open end of the battery casing and adapted at the opposite end to be detachably mounted and watertightly sealed to the open end of the lens and reflector unit, said switching module comprising a module casing having a push button switch secured on a mounting bracket both of which are fixedly disposed wholly within the module casing with the button member of said switch aligned with an opening in the wall of the module casing and contact means adapted through activation of the push button switch for completing or interrupting an electrical circuit between the battery casing, the lens and reflector unit and at least one said battery when said battery is included in said battery casing; a flexible boot member disposed and secured over the opening in the wall of the module casing where the button member of said switches faces so as to provide a watertight seal thereat.

Re. 29,048

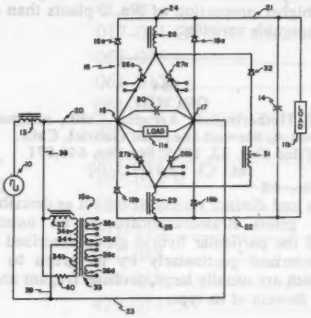
AC AND DC REGULATOR CIRCUIT

Harold J. Brown, Lorain, Ohio, assignor to ACME Electric Corporation, Cuba, N.Y.

Original No. 3,576,443, dated Apr. 27, 1971, Ser. No. 34,062, May 4, 1970. Application for reissue Apr. 16, 1973, Ser. No. 351,440

Int. Cl.[2] H02J 3/00; H02M 5/257, 7/155

U.S. Cl. 321—18 2 Claims



20. In a circuit for providing a regulated squarewave output voltage from unregulated AC input voltage terminals, in combination, phase-responsive buffer means for developing a compensatory voltage in response to a flow of quadrature current therethrough and for choking off the flow of excess in-phase current therethrough when the phase displacement between the input and output voltages is diminishing, load circuit means, means for connecting said phase-responsive buffer means and said load circuit means in series relationship across AC input voltage terminals, unidirectional electrical storage means, switching means for conducting charging current through said storage means when the instantaneous AC voltage across said load circuit means attempts to rise above the voltage across said storage means and for conducting discharging current from said storage means when the instantaneous AC voltage across said load circuit means attempts to fall below the voltage across said storage means, means for connecting said storage means in voltage clamping relationship across said load circuit means through said switching means, means for controlling the discharging activity of said switching means in accordance with the volt-time integral of the voltage across said load circuit means,

said controlling means including a transformer having center-tapped primary winding means and secondary winding means, means for connecting the center tap of said primary winding means to one end of said load circuit means, saturable inductance means, resistance means, means for connecting one end of said primary winding means to the other end of said load circuit means through said saturable inductance means, means for connecting the other end of said primary winding means to said other end of said load circuit means through said resistance means, and means for connecting said secondary winding means in control relationship to said switching means.

Re. 29,049

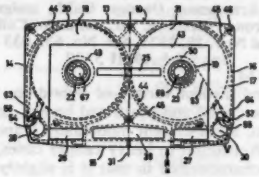
TAPE RECORDER AND MAGNETIC TAPE CASSETTE WITH MOVABLE TENSIONING AND BRAKE MEANS

Klaus Schoettle, Ludwigshafen; Joachim Hack, Frankenthal; Gustav Loewenberg, and Werner Hoffmann, both of Ludwigshafen, all of Germany, assignors to Badische Anilin- & Soda-Fabrik Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Original No. 3,800,322, dated Mar. 26, 1974, Ser. No. 174,471, Aug. 24, 1971. Application for reissue Mar. 17, 1975, Ser. No. 559,017

Int. Cl.[2] G11B 23/04, 19/22

U.S. Cl. 360—96 14 Claims



1. In combination, a tape recorder and a magnetic tape cassette, said cassette having a substantially rectangular housing having a bottom wall, a top wall and side walls and containing one or more reels adapted to carry packs of magnetic tape, the reels and magnetic tape being driven by spindles and capstans provided on the tape recorder and adapted to pass through openings in the bottom and/or top walls of the cassette, the recording and reproduction of signals after the cassette has been placed in position on the recorder being effected by tape-scanning means on the recorder and which, together with at least one pressure roller, are adapted to pass through at least one opening in the front wall of the cassette to bear against the magnetic tape passing along said front wall on the inside thereof, wherein there are provided in the cassette movable tensioning means for the tape and movable brake means for the reels, and said tensioning means and said brake means being spring-loaded towards a first position so as to assume said position when the cassette is removed from the recorder; said tape tensioning means having two tensioning levers which are hingedly mounted near the front wall of the cassette to pivot in the plane of the cassette, and said reel brake means having two brake portions opposite said two reels, respectively; each of said tensioning levers being located in the first position of said tensioning means, around a corresponding opening in the cassette housing for the admission of a corresponding guide roll on the recorder, in gripping relationship to said tape so as to hold said tape taut in a plane parallel to the front wall of the cassette, and each said brake portion being located, in the first position of said brake means, in flange-gripping relationship to the corresponding reel so as to prevent said reel from turning in at least one direction and wherein there are provided means on the recorder designed to pass through apertures in the bottom wall and/or top wall of the cassette for moving said tensioning means and said brake means, when the cassette is placed on the recorder, to a second position in which said tensioning levers release said tape and said brake portions release said reels and in which reel guidance, and also tape guidance at least along said front wall, are effected exclusively by means, including said guide rolls, provided on the recorder independently of the cassette housing.

PLANT PATENTS

GRANTED NOVEMBER 23, 1976

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

3,983
ROSE PLANT
David L. Armstrong, Orange, Calif., assignor to Armstrong Nurseries, Inc., Ontario, Calif.
Filed Nov. 18, 1975, Ser. No. 633,033
Int. Cl.² A01H 5/00
U.S. Cl. Plt.—14 **1 Claim**

1. A few and distinct variety of hybrid tea rose, substantially as described and illustrated herein, and having, in combination, a tall upright moderately branched habit of growth with medium to heavy caliper canes, and foliage which is characterized in that it is slightly more resistant to mildew, on the average, than plants of a similar variety grown under parallel conditions, said rose plant further bearing buds of a light yellowish white color which open to blooms ranging from 3¾ to 4½ inches in diameter which have from 35 to 45 petals, plus 5 to 10 petaloids, and about 160 stigmas, the variety further being characterized in that a row of such plants tends to yield a higher proportion of No. 1 plants than does a row of comparable varieties.

3,984
ORCHID
Ernest E. Hetherington, Arcadia, Calif., assignor to Fred A. Stewart Inc., San Gabriel, Calif.
Filed Dec. 22, 1975, Ser. No. 643,071
Int. Cl.² A01H 5/00
U.S. Cl. Plt.—68 **1 Claim**

1. A new and distinct variety of orchid as described and illustrated, genus Brassolaeliocattleya, an outstanding member of the particular hybrid group described herein, and characterized particularly by its green to yellow flowers which are usually large, profuse, fragant and long-lasting for flowers of its type.

PATENTS

GRANTED NOVEMBER 23, 1976

ERRATA

For CLASS	See PATENT NO.
017-001 G	3,992,734
051-035	3,992,826
061-012	3,992,886
061-041 A	3,992,887
072-106	3,992,929
084-322	3,992,975
102-024 R	3,993,001
108-053.1	3,993,168
211-116	3,993,205
061-088	3,993,273
429-048	3,993,501
429-051	3,993,502
429-103	3,993,503
427-126	3,993,504
429-176	3,993,507
029-623.2	3,993,508
250-209	3,993,569
526-004	3,993,634
536-030	3,993,640
204-272	3,993,653
425-125	3,993,787
235-144 ME	3,993,895
250-527	3,993,911

PATENTS

GRANTED NOVEMBER 23, 1976

NOTE—A cross reference listing of applications published under the second Trial Voluntary Protest Program is located in the back of this Issue. These entries will be in numerical order by document publication number.

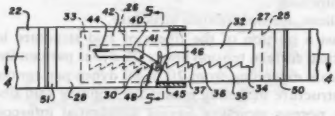
GENERAL AND MECHANICAL

3,992,720

ADJUSTABLE HEADBAND

John Nicolinas, 3390 Nanaimo St., Vancouver, B.C., Canada (V5N 3G6)

Filed Dec. 29, 1975, Ser. No. 645,026
Int. Cl.² A42B 3/00
U.S. Cl. 2—418 **3 Claims**



1. An adjustable headband for a hat comprising a flexible strap secured to the hat and having opposite ends, a relatively rigid extension member at each opposite end of the strap arranged to partially overlap longitudinally in an area accessible to the fingers of a wearer of the hat, and tensioning means for tightening the strap around the head of the wearer, said tensioning means including a plurality of teeth on one extension member, a lever pivotally secured to the other extension member and having a teeth-engaging part, and spring means biasing the part towards the teeth whereby a selected tension can be applied to the strap by manually increasing the overlap of the extension members.

3,992,721

SAFETY HELMET WITH INDIVIDUALIZED HEAD-CONTOURED INTER-LINER

William G. Morton, P.O. Box 841, Hopewell, Va. 23860

Continuation-in-part of Ser. No. 360,950, May 16, 1973, Pat. No. 3,882,546, which is a continuation-in-part of Ser. No. 323,195, Jan. 12, 1973, which is a continuation of Ser. No. 805,299, March 7, 1969, abandoned. This application Apr. 23, 1975, Ser. No. 570,712
Int. Cl.² A42B 3/00
U.S. Cl. 2—3 R **7 Claims**

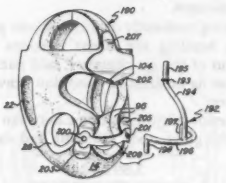
1. An improved safety helmet assembly adapted to be individualized to a wearer's head for distributing impact forces substantially uniformly over the head, comprising a substantially rigid dome-shaped shell, a deformable one-piece dome-shaped stretched leather cap member of substantially uniform thickness and positioned within said shell to define a dome-shaped cavity therebetween, said cap member being effective to receive the wearer's head and to conform to the contour of the head over the entire area covered by said cap member, said cap member having an outwardly projecting and peripherally extending integral flange portion forming a lower edge portion, means for connecting said lower edge portion of said cap member to the corresponding lower edge portion of said shell and forming a fluid-tight seal around the bottom of said cavity, means defining an opening extending to said cavity to provide for introducing a fluid expandable plastics foam material into said cavity after said cap member and said shell are positioned on the wearer's head, said cavity being filled with a substantially rigid expanded plastics foam material, and said material having an inner surface conforming to the contour of said cap member and the wearer's head.

3,992,722

PROTECTIVE HELMET

Jhoon Goo Rhee, 4068 Rosamora Court, Arlington, Va. 22207

Continuation-in-part of Ser. No. 527,910, Nov. 27, 1974, Pat. No. 3,934,271. This application July 24, 1975, Ser. No. 598,818
Int. Cl.² A63B 71/10
U.S. Cl. 2—424 **10 Claims**



1. A protective helmet adapted to be worn on a person's head and capable of absorbing energy and generally conforming to the shape of a person's head, said helmet constructed entirely of resilient foam means covered with a tough, pliable surface casing completely enclosing said foam means said helmet comprising openings in said helmet which are generally contoured in shape to conform to the periphery of the person's ears and chin, a single opening which is generally contoured in shape to conform to the periphery of the person's eyes, nose and mouth, the rear of said helmet being generally open and including a flap member adapted to protect the rear of the head and to aid in the putting on and taking off of said helmet.

3,992,723

HAND PUMPED VENTILATING SYSTEM FOR HAND COVERING

Panayiotis A. Lazanas, 1, Doras Distria Str., Athens 140, Greece

Filed May 5, 1975, Ser. No. 574,289
Claims priority, application Greece, Sept. 2, 1974, 94816
Int. Cl.² A41D 19/00
U.S. Cl. 2—161 R **5 Claims**

1. An elastomeric glove adapted for pumping air over the wearer's hand when flexed comprising:

a wrist portion, four finger portions, a thumb portion, a palm portion joining said finger, thumb and wrist portions to form a front face area of the glove, and a back portion joining said finger, thumb and wrist portions including a knuckle area extending from said finger portions toward said wrist portion;

an outer panel of elastomeric material having the characteristic of independently returning to its original unstressed shape after being resiliently distorted, said panel being peripherally joined to the back portion in airtight condition and extending from said four finger portions and said thumb portion, the panel at said knuckle area being

spaced from said back portion and in unstressed condition when the finger portions are extended to a straightened condition to form an air chamber with said back portion;

valve means for controlling airflow between the outside and the air chamber;

passages extending from the air chamber to the ends of the finger portions and the thumb portion;

valve means for controlling airflow between the air chamber and the passages;

said panel being resiliently distortable into a stressed condition upon bending the finger portions whereby air is pumped out of the air chamber, said panel on resiliently returning to its unstressed condition drawing air into the air chamber;

said wrist portion allowing airflow between the outside and inside of the glove upon pumping and suction of air.

3,992,724

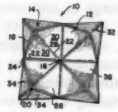
NOVELTY DEVICES

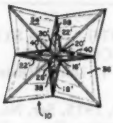
Robert W. Bosler, Levittown, Pa., assignor to Design Interface, Inc., Princeton, N.J.

Filed May 14, 1975, Ser. No. 577,396

Int. Cl.² A42B 1/18

U.S. Cl. 2—173 **20 Claims**





1. A folded structure comprising:

a. a substantially square base sheet having a center, four base edges and four base corners with eight base folds therein, four of said base folds being convex base folds passing from the midpoint of each of said base edges forming four minor squares, said minor squares being bounded by said convex base folds and said base edges; four of said base folds being concave base folds bisecting said minor squares form said center to said base corners to form eight base minor triangles; and

b. four outer sheets connected to each of said minor squares along said base edges, said outer sheets each having a concave outer sheet fold extending from said base corners bisecting said outer sheets forming eight outer sheet triangles, said outer sheets and said minor square sheets forming four four-sided elements each comprised of two base minor triangles and two outer sheet triangles.

3,992,725

IMPLANTABLE MATERIAL AND APPLIANCES AND METHOD OF STABILIZING BODY IMPLANTS

Charles A. Homsy, 11526 Raintree Circle, Houston, Tex. 77024

Continuation-in-part of Ser. No. 416,641, Nov. 16, 1973, abandoned, which is a continuation of Ser. No. 145,497, May 20, 1971, abandoned. This application Oct. 17, 1974, Ser. No. 515,443

Int. Cl.² A61F 1/24

U.S. Cl. 3—1 **35 Claims**

1. A composition of material suitable for in vivo implantation comprising

a resilient, fibrous, porous structure,

at least a portion of the fibers of said structure having a critical surface tension above 35 dynes per centimeter on a scale extending from 20 to 80 dynes per centimeter,

said structure including means for bonding said fibers into the porous structure having substantial interconnected spaces between the fibers, and

said fibers and said bonding means both being biocompatible.

said structure having sufficient resiliency and distensibility when implanted to develop the type of ingrowth tissue needed at the implant location responsive to the mechanical forces at the implant site.

3,992,726

ENDOPROSTHETIC BONE JOINT DEVICES

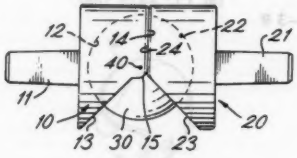
Michael Alexander Reykers Freeman, London, and Michael Anthony Tuke, Sutton, both of England, assignors to National Research Development Corporation, London, England

Filed July 30, 1975, Ser. No. 600,475

Claims priority, application United Kingdom, Aug. 7, 1974, 34812/74

Int. Cl.² A61F 1/24

U.S. Cl. 3—1.91 **8 Claims**



1. An endoprosthetic bone joint device comprising:

first and second components each in the form of a cup having its exterior surface adapted for securement to a respective bone of the relevant joint, and

a third component in the form of a roller freely located in and between said cups in articulatory engagement therewith,

at least one of said cups having a rim which is contoured to provide two mutually-inclined stop surfaces which individually abut the rim of the other cup to respectively limit articulation in the opposite senses of a predetermined direction, and

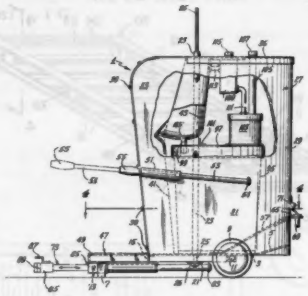
said one cup rim being profiled to provide two similarly curved surfaces continuing from respective ends of one of said stop surfaces, which curved surfaces rollingly and slidingly engage said other cup rim to inhibit articulation in a direction transverse to said predetermined direction.

3,992,727

PORTABLE TOILET

Luther Elkins, 13031 Forest Drive, Bowie, Md. 20716

Continuation of Ser. No. 388,903, Aug. 16, 1973, abandoned.
This application Jan. 17, 1975, Ser. No. 541,987
Int. Cl.² E03D 7/00, 13/00
U.S. Cl. 4—10 15 Claims



1. A wholly self-contained portable toilet comprising:

a. an enclosed housing having front, rear and side opposing walls, said front wall spanning the distance between said side opposing walls and having a first portion extending upwardly and a second portion extending generally upwardly and rearwardly from said first portion toward said rear wall;

b. a separate and distinct human waste receptacle within said housing;

c. a human waste basin formed in and being a part of said second portion and positioned above said receptacle;

d. said receptacle and said basin having openings therein, said basin opening being adjacent said receptacle opening whereby human waste passes from said basin into said receptacle and is wholly retained therein;

e. a pair of forwardly extending members, said forwardly extending members comprising a pair of substantially vertical side walls being positioned on said housing and extending outwardly and a substantial distance forwardly of said basin, whereby the user is provided with a degree of privacy, and

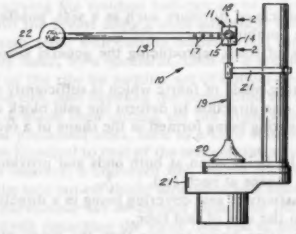
f. means for facilitating movement of the toilet from place to place including wheel means for rolling the toilet.

3,992,728

WATER SAVING TOILET DEVICE

Walter M. Jay, 8422 Neva Ave., San Diego, Calif. 92123

Filed Oct. 28, 1975, Ser. No. 626,468
Int. Cl.² E03D 3/12; A61B 19/00
U.S. Cl. 4—67 R 1 Claim



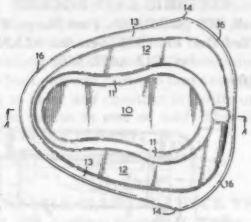
1. A water saving toilet device, comprising in combination, a manually operated lever handle supported on a pivot shaft that is supported on a toilet tank, said lever handle being affixed respective to a lift lever so that when said lever handle is pivoted about said pivot shaft, said lift lever is likewise pivoted, said lift lever at one end having a row of openings therethrough transversely, one of said openings selectively receiving a bolt fastener therethrough, said bolt fastener also being received through an eye formed at an upper end of a vertically extending downward lift rod, said bolt fastener also being received through a U-shaped member that includes parallel, spaced apart legs each of which has an opening therethrough for receiving said bolt fastener, said downwardly extending lift rod being slideably supported in a rod guide stationarily secured to an overflow pipe of said toilet tank, and a lower end of said lift rod having a rubber ball secured thereto, said rubber ball seating on a valve seat in a water discharge pipe, which communicates with a toilet bowl.

3,992,729

CARRIER OR SUPPORT MEANS FOR DISPOSABLE BEDPANS

Kenneth Wilson Mills, 11 Redcar Road, Smithills Dean, Bolton, Lancashire, BL1 2HP, England

Filed Apr. 14, 1975, Ser. No. 567,997
Int. Cl.² A47K 11/02; E03D 13/00
U.S. Cl. 4—110 4 Claims



1. A support for a disposable bedpan, comprising a dished center support portion defined by a substantially flat bottom, generally outwardly inclined side walls and an upper web wherefrom extends downwardly and outwardly a peripheral flange the major part of the circumference whereof extends for substantially less than the depth of said dished center part, said flange at each side and rearwardly of the transverse center line of the support being formed with downwardly and outwardly extending wing portions the extremities whereof are substantially on a level with said bottom of said dished center support portion, said extremities of said wing portions of the peripheral flange being substantially thickened to provide relatively wide non-abrasive bearing surfaces and a beading provided on the edge of said peripheral flange.

3,992,730

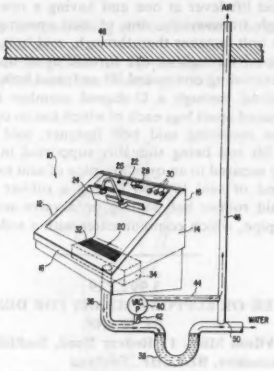
SCRUB SINK

Edwin Dyer Davis, 330 Clyde Morris Blvd., Daytona Beach, Fla. 32014

Filed Dec. 2, 1975, Ser. No. 637,104
Int. Cl.² A47C 19/00
U.S. Cl. 4—187 R 5 Claims

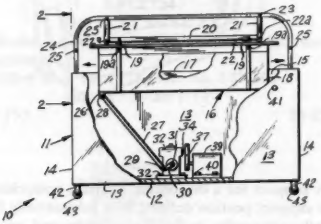
1. A personnel scrub sink comprising sidewalls, a bottom wall, a scrub fluid drain in the bottom wall connected to conventional fluid disposal means and a shower head connected to a source of scrub fluid via flow control valves characterized in that at least a portion of the bottom wall including the drain portion is perforate, a chamber below the perforate

zone, a vacuum pump, conduit means connecting the low pressure side of the vacuum pump and the chamber, and



further conduit means connecting the pressure side of the vacuum pump and an area remote from the scrub sink.

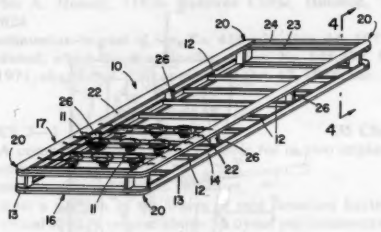
3,992,731
ELECTRIC BABY ROCKER
James Carswell, 809 N. 20th St., Fort Pierce, Fla. 33450
Filed Oct. 17, 1975, Ser. No. 623,556
Int. Cl.² A47D 9/02
U.S. Cl. 5—109 **2 Claims**



1. A baby rocker comprising in combination:
A. a carriage for containing a baby within;
B. a base, said base mounting rail means which are disposed overhead of the carriage;
C. plural pivotal link rods connecting rail means overhead of the carriage whereby to suspend the carriage for endwise, distortion-free rocking movement of the carriage relative to the base;
D. oscillating motor means on the base and an articulable rod connecting the said motor means to the carriage, whereby upon oscillation of the motor articulating movement is transferred via the rod to the carriage for reciprocable articulation thereof.

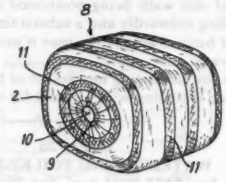
3,992,732
BOX SPRING CONSTRUCTION
Richard Thomas Cervisi, 601 College Ave., Kentfield, Calif. 94908
Filed Dec. 29, 1975, Ser. No. 645,080
Int. Cl.² A47B 23/04
U.S. Cl. 5—263 **7 Claims**

1. A box spring construction, including an upper rectangular wooden frame and a lower rectangular wooden frame, rigid wooden corner connecting means establishing a spacing between the two frames and preventing sway of the upper frame with respect to the lower frame, transverse and longitudinal wire retaining means extending horizontally across the upper frame generally in the plane of the upper frame, transverse wooden members extending across the lower frame, and coil



springs extending vertically between and connected to the transverse wire retaining means and the transverse wooden members, with the connection between the coil springs and the transverse wooden members made by the passage of the spring end through a bore in the wooden member.

3,992,733
FURNISHING ARTICLE OF FOAM MATERIAL
Georges Racine, Nice, France, assignor to Georges Racine, Nice, France
Filed May 24, 1974, Ser. No. 473,215
Claims priority, application France, May 29, 1973, 73.19501
Int. Cl.² A47G 9/00
U.S. Cl. 5—337 **1 Claim**



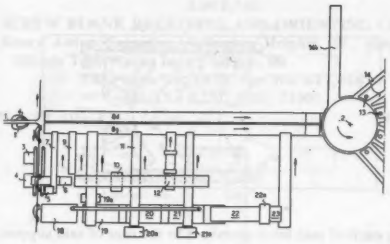
1. In an article of furniture such as a seat, pouffe, sofa or cushion, the combination comprising,
a. a block of foam reproducing the general shape of the article,
b. a covering made of fabric which is sufficiently elastic in at least one direction to deform the said block of foam,
c. said covering being formed in the shape of a rectangular tube,
d. said tube being open at both ends and provided with a closure means at each end,
e. said elasticity of said covering being in a direction transverse to the axis of said tube,
f. said covering being smaller than the block of foam to compress the foam when inserted into said block,
g. said closure means drawing the end of the covering over the exposed end of the block foam to conceal said foam.

3,992,734

BONING MEAT

Gabriel Chiron, La Gaubretiere, and Maurice Fradin, Saint Jean de Monts, both of France, assignors to Agence Nationale de Valorisation de la Recherche (ANVAR), France

Filed May 1, 1974, Ser. No. 465,971
Claims priority, application France, May 3, 1973, 73.15824
Int. Cl.[2] A22C *17/04*
U.S. Cl. 17—1 G 15 Claims



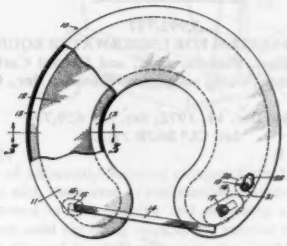
1. A plant for boning the meat of the half-carcass of a skinned beast, comprising for each half-carcass rail means provided with suspension hooks on which the half-carcass is suspended from the rear knuckle, means for propulsion of the warm and still supple half-carcass on a first track between two pairs of belts rotating about vertical axes which provide for its translatory movement, at a first station on said first track cutting means for removing the shoulder during movement of the half-carcass, at a second station on said first track, means for cutting the neck and means for removing the fillet, top, top flank, thin flank, membrane, filet mignon and tail; on a second track substantially perpendicular to the first track, where the portions detached on the first track are carried by a conveyor belt, means for boning the neck, means for boning the leg and marrow bone, the latter means including a lathe adapted to receive a plurality of rotary cutters which are elastically applied around the bone, means for boning the shoulder blade originating from removal of the shoulder carried flat by a conveyor belt to two successive stations where one set of cutters detaches the lower meat and the top meat; on a third track parallel with the second where the residual half-carcass is carried by its suspension hook on an inclined plane where a spring and a guide are capable of straightening the vertebral column which is gripped then by a driving chain having elastic hooks carrying the residual half-carcass to a first station for cutting off the breast using a semi-automatic tool comprising cutters associated with cutting blades, while the flank is detached by hand, by a specialist, then to a second station for removal of the ribs by another set of cutters penetrating between the ribs, and between the projections on the vertebral column, a blade then cutting off the thigh which is carried away and processed later, then to a third station where a set of cutters identical to that of the second station is operated in a similar manner; a conveyor belt with a friction gear drive driving the said cut-off thigh, supported by a hook in the bone hole, a curvilinear set of cutters detaching the chump end bone, a knife detaching the rump, the rest of the thigh being carried away, a curved set of cutters cutting off the top rump, the bone lifted by the rollers and engaged in an arc of cutters clamping elastically around the thigh with an oscillating rotary movement adapted to detach the meat from the bone.

3,992,735

FLOTATION RING FOR DREDGE PIPE LINES

Edward P. McCarthy, 360 SW. 18th Terrace, Miami, Fla. 33129

Continuation-in-part of Ser. No. 519,811, Nov. 1, 1974, abandoned. This application Sept. 11, 1975, Ser. No. 612,361
Int. Cl.[2] B63B *21/52*
U.S. Cl. 9—8 R 5 Claims



1. A flotation ring for dredge pipe lines comprising, in combination, a substantially flat pair of C-shaped front and back sidewall portions of a tough flexible resilient water-tight material, means for securing peripheral marginal edge portions of said front and back sidewall portions to one another to define an inflatable chamber, said peripheral securing means comprising means for stiffening the outer peripheral edge portions of said sidewall portions to increase the tensile strength therealong as compared with remaining portions of said front and back sidewall portions thus causing the resulting C-shaped ring to close and constrict inwardly upon inflation, and air passage means in one of said sidewall portions to permit inflation of said chamber.

3,992,736

EXPANDABLE ELEMENT CHECK VALVE

Edgar A. Reed, 3rd, Ambler; Kenneth T. Koper, Philadelphia, and Dennis H. Vaders, Warminster, all of Pa., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Dec. 22, 1975, Ser. No. 642,938
Int. Cl.[2] B63B *21/52*
U.S. Cl. 9—8 R 11 Claims

1. An entrapped air floatation device for deployment of a non-buoyant object from an elevated position in air into a body of water, comprising, in combination:

an inflatable member formed to dependingly support the object and having an orifice formed therein for restricting fluid flow out of said member, for allowing sufficient air into said member during descent from the elevated position to provide adequate buoyancy for the object, and for allowing water into said member thereafter, said orifice

being positioned below the air-water interface after the device reaches a floating position in the water; and

water-actuated valve means registered with said orifice for sealing said orifice upon contact with the water allowed into said member;

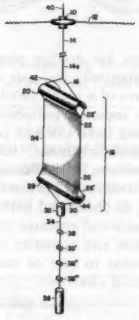
whereby the air pressure attained in said member is prevented from escaping through the sealed orifice in high sea states producing low frequency oscillations.

3,992,737

SUSPENSION SYSTEM FOR UNDERWATER EQUIPMENT

Don Myrton Duel, Phoenix, Ariz., and Helmut Carl Maiershofer, Valencia, Calif., assignors to Motorola, Inc., Chicago, Ill.

Filed Dec. 11, 1975, Ser. No. 639,738
Int. Cl.² B63B *21/52*
U.S. Cl. 9—8 R **19 Claims**



1. A system for deploying and suspending an equipment package in an underwater environment, comprising in combination:

means for buoyant support of the system;

means for tubularly enclosing the system for protection during deployment into the underwater environment and adaptable for positional stabilization of the system in the water, said tubular means having a diameter, said means for tubularly enclosing the system further comprising:

at least two longitudinally sectioned members of a hollow tube, each of said at least two longitudinally sectioned members having an open concave side along a long dimension of said sectioned member and said open side having two edges; and

means for enclosing each of said open sides for restricting a flow of water therein to the direction of said longitudinal dimension, said means for enclosing therefore creating a virtual water mass by means of said enclosures;

first means for suspending the equipment package from said tubular means; and

second means for suspending said tubular means from said buoyant support means.

3,992,738

WATER SKI BINDING

James E. Kiefer, 2510 Lone Jack Road, Olivenhain, Calif. 92024

Filed Oct. 16, 1975, Ser. No. 622,222
Int. Cl.² A63C *15/06*
U.S. Cl. 9—310 AA **11 Claims**

1. In a water ski binding having a foot piece rigidly fixed to the water ski and a heel piece longitudinally movable on said water ski into position to grip the heel of the wearer comprising:

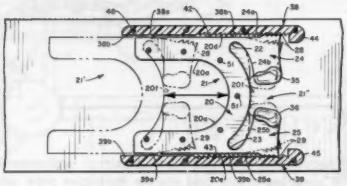
a mounting plate for said heel piece;

a pair of guide means secured to said water ski on opposite sides of said mounting plate for quiding said mounting plate and heel piece for movement along said ski;

each of said guide means comprising an upright guide surface located opposite one outer side of said mounting plate;

a plurality of ratchet teeth cut into one portion of each of said guide surfaces;

said mounting plate comprising a support member attached to said heel piece, a pair of latch members located rearward of said support member and spring means connecting each of said latch members to the rear of said support member,



a plurality of latch teeth extending from the outer side of each of said latch members, said latch teeth normally engaging a part of said ratchet teeth after said heel piece is positioned, said latch and ratchet teeth being shaped to prevent rearward movement of said mounting plate when engaged;

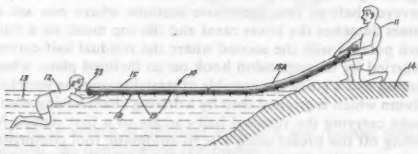
each of said spring means being deformed by an inwardly directed force on said latch member attached thereto to permit said latch member to move inwardly and disengage said latch teeth from said ratchet teeth thereby permitting rearward movement of said mounting plate for adjustment or removal of the ski.

3,992,739

WATER SAFETY DEVICE

Daryl A. Stevens, 610 N. 10th St., and Russell D. Wicktor, Rte. 3, both of Princeton, Minn. 55371

Filed May 27, 1975, Ser. No. 580,903
Int. Cl.² B63C *9/00*
U.S. Cl. 9—14 **7 Claims**



1. A water safety device to enable a rescuer person to lend assistance to an imperiled victim comprising:

a single elongated linear cylindrical tube having closed and sealed ends as a linear continuation of said tube adapted to be inflated with a gas to form a longitudinal linear semi-rigid elongate, floatable tube, said tube being bendable about a generally linear natural axis, said tube having a first end that, when inflated, can be maneuvered toward an imperiled victim in the water and a second end that can be manipulated by a rescuer person for maneuvering the first end, said inflated tube having a diameter dimension of a size to be readily grasped by a rescuer person and an imperiled victim, said tube being deflatable for rolling into a compact bundle;

a pouch located on the tube near and inwardly of the second end thereof;

a compressed gas supply cartridge located in the pouch, means connecting the cartridge to the tube for carrying gas from the cartridge to the tube for inflation of the tube;

releasable valve means associated with said compressed gas supply cartridge for selective release of compressed gas from the gas supply means to the tube by a rescuer person while holding said second end for inflating of the tube to form said semi-rigid, longitudinal, elongate tube; and

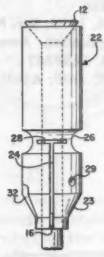
a safety line extending the length of the tube and means fastening said safety line to the tube so that the safety line can be grasped by an imperiled victim.

3,992,740

SCREW BLANK RECEIVING AND ORIENTING COLLET

Henry Anton Sygnator, Arlington Heights, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

Filed Sept. 29, 1975, Ser. No. 617,464
Int. Cl.² B23G *9/00, 11/00*
U.S. Cl. 10—2 **9 Claims**



1. A collet for receiving and orienting screw blanks with radial wings formed thereon and adapted to hold the blanks during a subsequent forming operation performed on the extremities of the blanks, comprising a tubular-like member with a through bore extending axially therein, the upper portion of the bore being of a first predetermined diameter which is greater than the diameter of the shank to e accommodated therein, the lower portion of the bore being of a second predetermined diameter which is less than said first predetermined diameter, a slot formed longitudinally of the tubular member from the lowermost extremity thereof upwardly through the second diameter portion and intersecting the central axis of the collet, a blank rotating cam surface means formed in the wall of the bore sloping downwardly from the first diameter portion to the second diameter portion along a predetermined segment of the periphery of the bore, the lowermost extremity of the cam surface means intersecting the slot, wherein the wings formed on the blank may abut the cam surface as the blank is inserted in the collet causing the blank to rotate until the wings are aligned with the slots in the lower portion of the collet.

3,992,741

FOLD BIND MACHINE

Henry N. Staats, Deerfield, Ill., assignor to General Binding Corporation, Northbrook, Ill.

Filed May 12, 1975, Ser. No. 576,386
Int. Cl.² B42C *19/00*
U.S. Cl. 11—1 R **14 Claims**

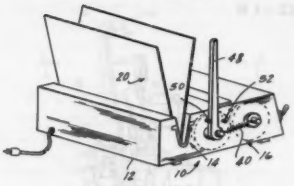
1. Apparatus for making a thin booklet by binding loose sheets into an adhesive folded cover comprising:

a housing,

a longitudinally extending opening in the top of said housing;

a heater unit of generally deeply grooved cross-section open at the top and disposed in said housing facing said opening to receive therein from above, the folded edge of the adhesive cover;

heating element means operatively associated with said heater unit;



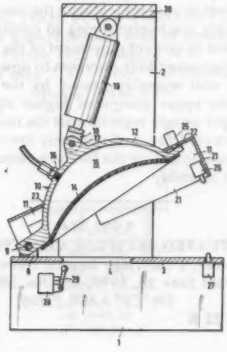
a pair of adjacently disposed elongated pinching roll members with their axes in substantially parallel relationship mounted in said housing and providing a nip therebetween, said nip being open at the exterior of the housing and adapted to receive therein the folded edge of the adhesive cover containing sheets to be bound therein.

3,992,742

GLUING PRESS FOR SHOES OR OTHER SIMILARLY SHAPED WORKPIECES

Herbert Funck, Am Wasserbogen, Germany, assignor to Dr. Ing. Funck K.G., Munich-Pasing, Germany

Filed Jan. 28, 1976, Ser. No. 653,021
Claims priority, application Germany, Jan. 28, 1975, 2503381; Oct. 31, 1975, 2548943
Int. Cl.² A43D *00/00*
U.S. Cl. 12—1 F **19 Claims**



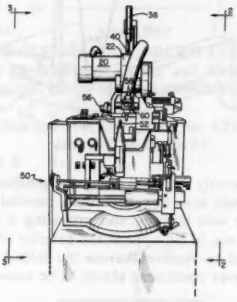
1. A gluing press for shoes or other similarly shaped workpieces, having a pressure-medium-operated pressure cushion whose highly resilient diaphragm fixes the sole to be attached during the gluing operation on the shoe upper placed on a last and retained in a shoe-receiving device, a feed movement taking place between the pressure cushion and the shoe-receiving device before the gluing operation wherein a switch is disposed on the shoe-receiving device, said switch being constrainedly operated by the introduction of the shoe upper and switches on the drive for the closure movement of the operative parts of the gluing press formed on the pressure cushion and the shoe-receiving device, and a safety device is connected to one of the operative parts of the gluing press which, when deflected by an obstacle in the path of movement of the movable part of the gluing press, switches off or reverses the drive.

3,992,743

ROUGHING MACHINE WITH DAMPER MECHANISM

Walter Vornberger, Tewksbury, Mass., assignor to International Shoe Machine Corporation, Nashua, N.H.

Filed Apr. 12, 1976, Ser. No. 676,031
Int. Cl.² A43D *00/00*
U.S. Cl. 12—1 R **2 Claims**



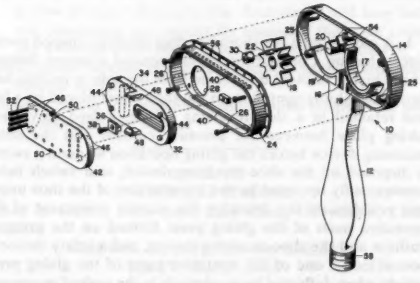
1. A roughing machine comprising: a support for so supporting bottom-up a shoe assembly that includes the margin of an upper that the upwardly facing surface of the upper margin has segments of different elevations; a roughing tool assembly, that includes a roughing tool, located above said margin and mounted for heightwise movement; means for so moving the support as to move successive segments of the upper margin past the roughing tool; yieldable force applying means so connected to the roughing tool assembly as to yieldably urge the roughing tool downwardly against the upper margin under relatively low pressure; and a damper mechanism having a follower element in engagement with the roughing tool assembly, said damper mechanism being so constructed as to provide a resistance to upward movement of the follower element of relatively high magnitude pursuant to upward movement of the roughing tool assembly caused by the movement of a segment of the upper margin of higher elevation than the preceding upper margin segment past the roughing tool and to impart a downward force of relatively low magnitude to the follower element to enable the follower element to engage the roughing tool assembly.

3,992,744

LIQUID ACTUATED RECIPROCATING SHOWER BRUSH

Friedbert Fassler, 1 Partridge Square, Oswego, Ill. 60543

Filed June 20, 1975, Ser. No. 588,655
Int. Cl.² A46B *13/06*
U.S. Cl. 15—22 R **10 Claims**



1. A brush having a reciprocating head, which comprises:

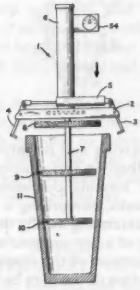
a. a housing,
b. a liquid inlet to said housing,
c. a turbine member positioned in said housing to be rotated by liquid entering said housing through said inlet,
d. a cover for said housing having an aperture therein,
e. a brush drive plate slideably mounted on said housing cover, said brush drive plate having a surface facing said turbine member, and the surface having a cam slot therein,
f. a pin mounted on said turbine member and extending through the aperture in said cover and into the cam slot on said brush drive plate, the cam slot having a configuration such that rotary motion of said turbine member is converted directly to reciprocating motion of said brush drive plate, and
g. a brush head mounted on said brush drive plate.

3,992,745

CLEANING UNIT FOR INTERNAL MECHANICAL CLEANING OF CONTAINERS SUCH AS MOULDS

Jaakko Johanes Laurila, Hallefors, Sweden, assignor to Ferrox AB, Grythyttan, Sweden

Filed Jan. 28, 1975, Ser. No. 544,858
Claims priority, application Sweden, Feb. 18, 1974, 7401686; July 18, 1974, 7409367
Int. Cl.² B67C *1/08*; A46B *7/02*, *13/02*
U.S. Cl. 15—56 **12 Claims**



1. A cleaning device for brush cleaning the inside of the side wall of a receptacle having an opening in one of its end walls, said cleaning device comprising:

support means releasably attachable to said end wall in a position overlying said opening;

at least one brushing member composed of a pair of complementary parts shaped and disposed to define an outer peripheral outline approximately matching the inner cross-sectional outline of the receptacle side wall to be cleaned, brushing means secured to the outside of each of said parts, said parts being movable relative to each other so that the outer peripheral outline of the brushing means is selectively placeable in a position in which the brushing means are in brushing contact with the inner side wall surface and a position in which they are out of contact therewith; and

actuating means including a rod extending into said support means concentrically with a lengthwise axis of the receptacle, said brushing means being crosswise and centrally disposed relative to the rod and secured thereto against rotational and axial displacement, first moving means mounted on said support means coacting with said rod for axially displacing the same in either direction and thus also the brushing means, and second moving means mounted on said brushing member coupled to the two parts thereof for selectively moving the brushing means

into and out of brushing contact with the side wall to be cleaned.

3,992,746

APPARATUS FOR THE TREATMENT OF TEXTILE FABRICS

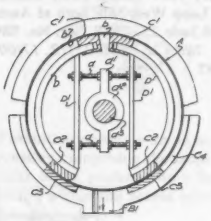
Eric Stanley Rhodes, 6, Valley Drive, Westwood Park, Leek, County of Stafford, England

Continuation-in-part of Ser. No. 534,882, Dec. 20, 1974, abandoned, which is a continuation of Ser. No. 314,970, Dec. 14, 1972, abandoned. This application Feb. 24, 1975, Ser. No. 552,623

Claims priority, application United Kingdom, Dec. 16, 1971, 58404/71

Int. Cl.² A47L *5/38*

U.S. Cl. 15—307 **3 Claims**



1. Apparatus for extracting moisture from a continuous length of fabric comprising a rotatable drum having a perforated cylindrical wall over which the fabric is drawn, a stationary shaft on which said drum is rotatably mounted, means for rotating the drum at substantially the linear speed of the moving fabric so that the fabric is in substantially tensionless state in passing over the drum, means defining a relatively stationary slot extending substantially throughout its length within and lengthwise of the drum adjacent the inner periphery of the drum, said slot defining means comprising two separate opposed plates mounted on said shaft and mounting a pair of opposed seal means having spaced facing edges defining said slot, said seal means being in sliding contact with the interior of said drum, means for relatively adjusting said plates to vary the spacing between said seal means and thereby vary the effective slot width, and means for applying suction to said slot for drawing air inwardly of the perforated cylindrical wall of the drum through the fabric.

3,992,747

CLEANING TOOL

Austen B. Hufton, Glen Ellyn, Ill., assignor to Service Master Industries Inc., Downers Grove, Ill.

Filed Apr. 9, 1975, Ser. No. 566,253

Int. Cl.² A47L *7/00*

U.S. Cl. 15—321 **20 Claims**

1. An improved tool adapted for cleaning a hard surface floor and the like, comprising:

housing means having a front edge, a rear edge, and a bottom portion which is adapted to be positioned so as to face the floor to be cleaned;

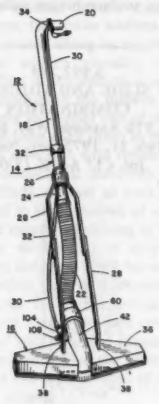
a scrubbing block having a bottom scrubbing surface which is adapted to be positioned in surface-to-surface contact with the floor to be cleaned;

handle means having a lower end which is connected with the scrubbing block so that back and forth movement of the handle may cause corresponding back and forth movement of the scrubbing block along and over the floor to be cleaned;

means for connecting the scrubbing block with the housing means, said connection means including spring means which permit limited relative movement between the housing means and the scrubbing block;

means carried by the housing means for discharging fluid onto the floor to be cleaned;

vacuum conduit means, having one end adapted to be connected with a source of vacuum;



fluid conduit means having one end adapted to be connected with the fluid discharging means and having its other end connected with a source of fluid; and

the housing means including means for removing fluid from the floor to be cleaned, with the fluid removing means being connected with the other end of the vacuum conduit means.

3,992,748

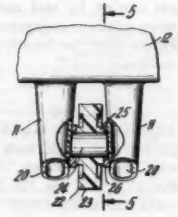
CARPETING TOOL FOR A VACUUM CLEANER

Sol Howard, and Robert Schaaf, both of Brooklyn, N.Y., assignors to Air Filters, Inc., Brooklyn, N.Y.

Filed May 7, 1975, Ser. No. 575,408

Int. Cl.² A47L *9/06*

U.S. Cl. 15—397 **8 Claims**



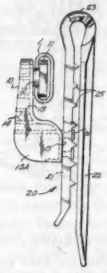
1. A carpeting tool for a broom-type vacuum cleaner, said tool comprising two oppositely extending lateral hollow flanges, an open ended connecting tube secured intermediately between said flanges to upper surfaces of said flanges, said connecting tube extending rearwardly and upwardly from said flanges, said flanges including a mutual lower surface opposite each of said upper surfaces of said flanges, a plurality of spaced hollow teeth extending vertically downwardly from said lower surface on each side of said connecting tube to define a hollow rake, an opening provided in a free end portion of each of said teeth for communicating through each of said teeth into said flanges to said connecting tube, support means connected to said tool and extending below said free end portion of each of said teeth for supporting said tool and the vacuum cleaner when said tool is attached to the vacuum cleaner, said support means including an arcuate surface means for permitting said tool to be alternately stroked for-

wardly and rearwardly with said arcuate surface means in contact with carpeting in a manner which permits said tool to ride smoothly along the carpeting without abruptly snagging the carpeting, said arcuate means being disposed between adjacent teeth, said arcuate means being connected to said adjacent teeth, whereby weight of the vacuum cleaner is carried by said arcuate surface means rather than being carried by said teeth.

3,992,749
DRAPERY SLIDE AND ADJUSTABLE CLIP COMBINATION

F. Grant Getchell, 570 Antelope Way, Eugene, Oreg. 97401

Filed July 21, 1975, Ser. No. 597,476
Int. Cl.² A47H *15/00*
U.S. Cl. 16—93 D **6 Claims**



1. A carrier and drapery clip combination for suspending draperies from traverse rod, said combination comprising,

a carrier including a laterally offset head slidably mounted in the traverse rod, said carrier having an enlarged lower portion terminating forwardly in a forward wall surface forwardly offset from the traverse rod,

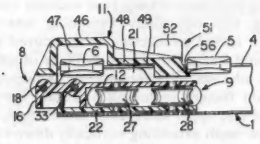
a bifurcated clip member having primary and secondary arms in biased engagement with the upper marginal area of a drapery, said clip member adapted for downward attachment to the drapery upper edge, and

cooperating means carried by said carrier and said clip member permitting selective engagement of said clip and carrier members to vary the height of a drapery hem above a floor surface.

3,992,750
HINGED SLIDE GATE

James A. Ford, and David E. Bell, both of Sturgis, Mich., assignors to Kirsch Company, Sturgis, Mich.

Filed Mar. 17, 1975, Ser. No. 558,836
Int. Cl.² E05D *13/02*
U.S. Cl. 16—95 D **14 Claims**



1. In a means for closing the end of a slotted traverse rod, the combination comprising:

a body receivable into the end of a traverse rod and rigidly fixable with respect thereto and including one portion of a hinge member extending from said body to a point exteriorly of said traverse rod;

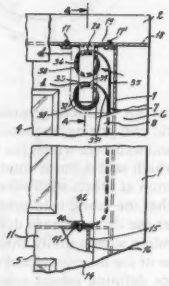
a gate member hingedly fixed to said hinge member and swingable about a hinge axis between a first position closely overlying the slot of said traverse rod and a second position rotationally spaced therefrom;

means for holding said gate member in said first position closely overlying the slot of the traverserod and comprising a latch structure extending from the free end of said gate member remote from the hinged portion thereof through said slot and detachably embracing one edge of a flange defining said slot.

3,992,751
SPRING SASH COUNTERBALANCE

Edwin E. Foster, 1801 Camp Craft Road, and Thomas E. Foster, 1800 Loop West 360, both of Austin, Tex. 78746

Filed June 23, 1975, Ser. No. 589,054
Int. Cl.² E05D *13/12, 17/00*
U.S. Cl. 16—197 **3 Claims**

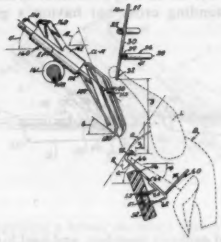


1. For use with a window having a frame incorporating side jambs, a header, and a sill and a sash mounted within said frame for reciprocal slideable movement therein toward and away from said header, said sash incorporating an upper portion, a counterbalance for said sash disposed within said frame and comprising at least two self-coiling springs of ribbon character arranged in vertically aligned relationship, each spring having a supply coil portion and an outer, normally free end directed toward the proximate jamb, means interengaging the outer ends of said springs in the extreme portions thereof and securing same to the upper portion of said sash, a support element affixed to said frame header, said element comprising vertically spaced apart transverse components having webs with spaced apart jamb-adjacent and jamb-remote edges, said outer end portions of each spring being directed over the associated transverse component for free suspension of the related supply coil therebelow, the radius of curvature of the convolutions of each spring coil being such that the end portion thereof led over the related transverse component engages the related web only on its said edges thereby developing spaced apart lines of contact whereby the respective suspended supply coils are restrained against rocking during coiling and uncoiling action responsive to movement of said sash.

3,992,752
VACUUM EVISCERATOR METHOD

Grover S. Harben, Jr., Gainesville, and Kenneth Z. Graham, Dawsonville, both of Ga., assignors to Gainesville Machine Company, Inc., Gainesville, Ga.

Division of Ser. No. 217,206, Jan. 12, 1972, Pat. No. 3,908,229. This application Sept. 23, 1974, Ser. No. 508,155
Int. Cl.[2] A22C *21/00*
U.S. Cl. 17—45 11 Claims

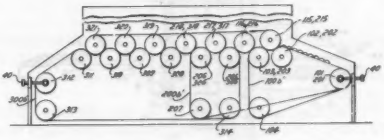


1. A method of orienting poultry with an access opening at their vent for processing comprising the steps of:
engaging the hocks of the poultry with a first member;
engaging the poultry within the access opening with a second member; and,
moving said first and second members apart to support the poultry with said members so that the breast portion of the poultry is flexibly supported in cantilever fashion solely through its bone and muscle structure while the access opening is held in a relatively fixed position with respect to said second member.

3,992,753
APPARATUS FOR DEFIBERING SHEATHS OF FIBROUS MATERIAL, PARTICULARLY SHEATHS OF ABACA

Juan T. Villanueva, and Jesus T. Villanueva, both of 105 Apo St., Quezon City, Philippines

Continuation-in-part of Ser. No. 258,875, June 1, 1972, Pat. No. 3,887,063, which is a continuation-in-part of Ser. No. 830,449, Jan. 4, 1969, Pat. No. 3,670,366. This application Jan. 23, 1975, Ser. No. 543,620
Int. Cl.[2] D01B *1/36*
U.S. Cl. 19—12 14 Claims

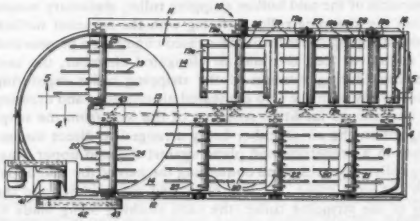


1. Apparatus for defibering sheaths of fibrous material, particularly sheaths of abaca, comprising a plurality of elongated conveyor means each comprising an upper and a lower endless conveyor having adjacent runs for positively engaging opposite surface portions of the sheaths therebetween for transporting successive sheaths sidewise along a predetermined path, said plurality of conveyor means comprising a first and a second conveyor means extending parallel and transversely spaced from each other and each having a leading end and a trailing end, the trailing end of said second conveyor being located downstream of the trailing end of the first conveyor means, and a third conveyor means inwardly spaced from said first and said second conveyor means and parallel thereto and having a leading end spaced in transverse and longitudinal direction from the trailing end of the first conveyor means to define therewith a gap and the trailing end of said third conveyor means being located downstream of the trailing end of said second conveyor means, the upper endless conveyor of each conveyor means comprising a plurality of pulleys each formed with a plurality of circumferential grooves and mounted spaced from each other in the direction of said path for rotation about parallel axes substantially normal to said path and endless flexible means located in said grooves of said pulleys, the lower endless conveyor of each conveyor means comprising along its upper run a plurality of pulleys each formed with a plurality of circumferential grooves which are offset in the direction normal to said path with respect to the grooves in the pulleys of the upper conveyor, the pulleys along the upper run of the lower conveyor being mounted spaced from each other in the direction of said path but offset in said direction with respect to the pulleys of the upper conveyor coordinated therewith for rotation about parallel axes substantially normal to said path, and endless flexible means located in said grooves of said pulleys in said lower conveyor; drive means for driving at least one pulley of each lower conveyor; and a pair of stripping means each comprising a stationary stripping blade having an edge extending with at least a portion thereof transverse to said path for stripping pulpy material from the fibrous material of said sheaths during transport thereof by said conveyor means, the edge portion of one of said stripping means being located in said gap and the edge portion of the other stripping means being located adjacent and downstream of the trailing end of said second conveyor means.

3,992,754
METHOD FOR CLEANING BAGASSE FIBER USING A U-SHAPED WASH PATH

John T. McCloskey, Richardson, Tex., and Eduardo J. Villavicencio, Mexico City, Mexico, assignors to Process Evaluation and Development Corporation, Dallas, Tex.

Division of Ser. No. 355,179, April 27, 1973, Pat. No. 3,877,110. This application Feb. 5, 1975, Ser. No. 547,278
The portion of the term of this patent subsequent to Apr. 15, 1992, has been disclaimed.
Int. Cl.[2] D01G *1/00*
U.S. Cl. 19—66 R 4 Claims



1. The method for removing associated foreign materials such as stones, gravel, coarse sand, and the like from fibrous vegetable materials by contacting said fibrous vegetable materials with a washing liquid in a U-shaped washing path wherein the loop of the U region of said path is substantially deeper than the remainder of said U-shaped path comprising:
a. repeatedly immersing and refloating the fibrous material in a wash liquid to separate associated foreign material therefrom and simultaneously transport said fibrous material and separated foreign material to the loop region of the U-shaped washing path;
b. repeatedly immersing and refloating the fibrous material in said loop region to separate foreign associated material therefrom and simultaneously transport said fibrous material through said loop region while (i) changing the

direction of transport of said fibrous material, (ii) permitting said separated foreign material to fall to the bottom of said loop region; and (iii) removing foreign material from the washing path at the bottom of said loop region;

c. transporting the fibrous material from said loop region and removing the fibrous material from the wash liquid; and

d. removing excess wash liquid from said fibrous material and allowing said excess wash liquid to flow back into said washer path.

3,992,755

APPARATUS FOR STRIPPING FIBROUS WEB FROM A ROTATING CYLINDER IN A TEXTILE MACHINE

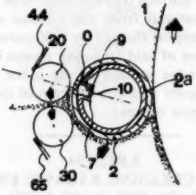
Ettore Bonalumi, Via Lega Lombarda 5, Bergamo, Italy 24100

Filed Nov. 13, 1974, Ser. No. 523,321

Claims priority, application Italy, Dec. 11, 1973, 2969/73

Int. Cl.² D01G *15/46*

U.S. Cl. 19—106 R **2 Claims**



1. An apparatus for stripping a web issuing from a carding machine comprising in combination: a doffer an upper and a lower web dragging roller, arranged for rotation in opposite direction, a hollow stripping roller having a spirally wound metallic carding clothing and arranged for rotation as the said upper web dragging roller and having a plurality of peripherally spaced spiral rows of apertures thereover, the said hollow stripping roller defining with the doffer a generatrix wherein the web is picked up from the doffer by means of the said card clothing, the latter being able to pick up the web from the said generatrix and to transfer the same to a diametrally opposed generatrix of the said hollow stripping roller, stationary means within the stripping roller defining with the adjacent surface of the stripping roller an air elongated chamber, a pressurized air source to feed the said air elongated chamber, the said apertures during rotation of the stripping roller registering successively with the said elongated air chamber and creating air impulses to facilitate stripping of the web from the stripping roller, the air chamber being arranged to direct the impulses in a predetermined plane against the said upper dragging roller, the said plane containing the axis of the said upper web dragging roller, the said elongated air chamber and the axis of the stripping roller, the card clothing being made of metallic band profiled with spaced isosceles triangles profiled teeth wound around the stripping roller, with the spiral step for two adjacent windings being 12–15 times the thickness of the metallic card clothing band.

3,992,756

SEPARABLE FASTENER

Gustave T. Stafstrom, Plymouth, Conn., assignor to Waterbury Buckle Company, Waterbury, Conn.

Filed Dec. 13, 1974, Ser. No. 532,476

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 3, 1976

Int. Cl.² A44B *11/25, 13/02*

U.S. Cl. 24—75 **6 Claims**

4. A separable fastener in the form of a hook and eye type buckle, said fastener comprising: an eye member having a forward portion defining an eye, and a hook member, said hook member having a forward portion including a base of sheet material having front and back surfaces generally parallel to one another, a hook having a forward end fixed to said base and extending upwardly from said front surface and rearwardly from said forward end, said base having an opening passing therethrough and underlying said hook, and a spring detent member fixed to said base and having a portion extending into said opening and arranged to be engageable with said eye when said eye is received on said hook in a fully hooked condition to yieldingly resist displacement of said eye from said hook, said eye of said eye member including a forward transversely extending cross bar having a given dimension

longitudinally of said eye member, and said hook of said hook member having a forward end portion which is directly connected to said base and which extends in a generally upward direction away from said base and an intermediate portion immediately following said forward end portion which intermediate portion extends in a generally rearward direction parallel to said base, said intermediate portion of said hook being spaced from said front surface of said base by a distance less than said longitudinal dimension of said forward cross bar of said eye so as to limit rotation of said eye member relative to said hook member when said eye is in said fully hooked condition with said hook.

3,992,757

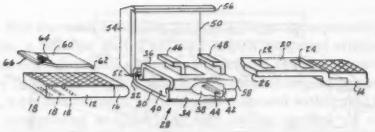
ADJUSTABLE SIDE OPENING WATCHBAND BUCKLE

Louis J. Danna, Palisades Park, N.J., assignor to Kreisler Manufacturing Corporation, St. Petersburg, Fla.

Filed Jan. 9, 1975, Ser. No. 539,640

Int. Cl.² A44B *11/28*

U.S. Cl. 24—77 R **10 Claims**



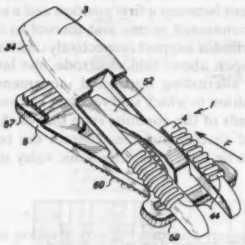
1. A buckle assembly for securing the buckle end of a band to the tongue end thereof including in combination, a frame forming a passage extending in the direction of the length of said band for receiving the buckle end of said band, means for adjustably securing said buckle end of said band in said passage, interengageable means on said frame and on the tongue end of said band for detachably connecting said tongue end of said band to said frame, a cover, means located at one side of said frame and running along the length thereof mounting said cover on said frame for pivotal movement around an axis generally parallel to the length of said band from an open position at which said interengageable means are accessible to a closed position over said interengageable means to retain said interengageable means in engagement, and means for releasably holding said cover in said closed position.

3,992,758

CLIP

Taizo Noda, Nishinomiya, Japan, assignor to Kohshoh Limited, Kyoto, Japan

Filed Apr. 23, 1976, Ser. No. 679,574
Int. Cl.² A44B 21/00
U.S. Cl. 24—251 6 Claims



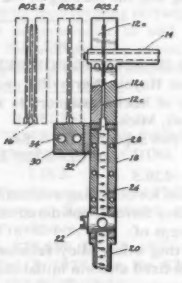
1. A clip comprising a lower member which includes a base plate, at least one bridge consisting of two legs protruding beyond said base plate and formed integrally therewith and an elongated portion extending between said two legs, and at least one pivot projection formed integrally with said base plate and positioned at the rear portion thereof; an upper member which includes a base plate and at least one bearing portion formed integrally with said base plate and positioned to receive said pivot projection; and a slide member which includes at least one slide plate and at least one crossplate formed integrally with said slide plate so as to slidably engage with the underside of said elongated portion of said bridge; wherein at least one of the opposite rear end portions of said upper and lower members are gradually reduced in thickness toward its rear edge so that clipping sections may be kept in open position at a desired angle.

3,992,759

BATTERY GRID PLATE MOLD AND METHOD

John Edgar Farmer, Chicago, Ill., assignor to Farmer Mold and Machine Works, Inc., Chicago, Ill.

Filed Aug. 25, 1975, Ser. No. 607,289
Int. Cl.² B23P 13/00; B22C 9/26
U.S. Cl. 29—2 5 Claims



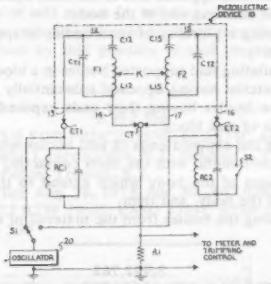
1. A method of producing grid-like battery plates which method comprises providing a pair of mating mold halves defining a mold cavity for molding the desired plate and having an elongated bottom slot as a bottom gate, providing a delivery head full of molten lead having a valved bottom inlet, a top slot-like discharge nozzle and a fanning-out distribution reservoir between said inlet and discharge nozzle, providing a source of molten metal under pressure connected to said inlet, mating said gate with said nozzle, controlling the flow of molten metal under pressure through said inlet to supply molten metal through said head and gate to fill said mold cavity and then terminate flow of molten metal, providing a cooling block adjacent to and laterally of said delivery head with a mass of insulation between said head and said block directly contacting both the head and the block, delivering coolant through said block, transferring the filled mold from said head laterally to said block while breaking the sprue between said head and said mold, cooling said mold and molded contents on said cooling block until the battery plate solidifies, transferring said mold laterally from said cooling block to an ejection station, and opening said mold at said ejection station for delivering the molded battery plate therefrom.

3,992,760

APPARATUS AND PROCESS FOR MEASURING THE RESONANT FREQUENCY AND COEFFICIENT OF COUPLING OF A PLURALITY OF COUPLED PIEZOELECTRIC RESONATORS

Gerald E. Roberts, Lynchburg, Va., assignor to General Electric Company, Lynchburg, Va.

Division of Ser. No. 506,800, Sept. 17, 1974, Pat. No. 3,907,517. This application Jan. 13, 1976, Ser. No. 648,791
Int. Cl.² B01J 17/00; H04R 17/00
U.S. Cl. 29—25.35 1 Claim



1. A process for adjusting the resonant frequency and coefficient of coupling a plurality of pairs of resonator electrodes mounted on opposite sides of a plate of piezoelectric material to form a plurality of coupled resonators, and a coupling strip positioned on one side of said plate between adjacent ones of said resonator electrodes, said process comprising the steps of:

a. applying a signal of a selected frequency to each of said pairs of electrodes while adjacent pairs of said electrodes are open-circuited;

b. trimming each of said pairs of electrodes to cause each of said resonators to resonate to its respective selected frequency while said adjacent pairs of electrodes are open-circuited;

c. applying a range of variable frequency signals to at least one of said pairs of electrodes while at least one other pair of said electrodes is short-circuited;

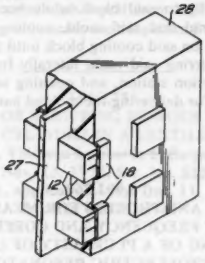
d. and trimming each of said coupling strips to provide two resonant conditions at two selected frequencies in said range of frequencies while said other pair of electrodes is short-circuited.

3,992,761

METHOD OF MAKING MULTI-LAYER CAPACITORS

David E. McElroy, Oreland, and George D. Mackenzie, Maple Glen, both of, PA, assignors to TRW Inc., Cleveland, Ohio

Filed Nov. 22, 1974, Ser. No. 526,272
Int. Cl.² H01G 13/00, 1/14
U.S. Cl. 29—25.42 8 Claims



1. A method of making a multi-layer capacitor comprising the steps of:

a. forming a plurality of bodies of substantially final length and width each of alternate layers of a dielectric material and a conductive material with each conductive layer being sandwiched between a pair of dielectric layers and with some of said conductive layers extending to one end of said body but being spaced from the opposite end of the body, and the other of said conductive layers extending to the said opposite end of the body but being spaced from the said one end of the body.

b. supporting a plurality of such bodies in spaced parallel relation,

c. encapsulating said supported bodies in a block of dissolvable material having opposed substantially flat surfaces with the bodies having their ends exposed at said flat surfaces of said block,

d. coating the exposed ends of said bodies with a film of a conductive metal with the films contacting the conductive layers of the body which extend to the respective ends of the body, and then

e. separating the bodies from the material of the block.

3,992,762

APPARATUS FOR THE MOUNTING AND SHAPING OF CONTACTS ON TELEPHONIC RELAY ELEMENTS

Raymond Gleizes, Fontainebleau, France, assignor to Maison Murat, Viry-Chatillon, France

Filed Feb. 27, 1975, Ser. No. 553,844
Claims priority, application France, Feb. 27, 1974, 74.06700
Int. Cl.² B23K 11/02; H01R 43/02
U.S. Cl. 29—33 M 9 Claims

1. Apparatus for mounting and shaping, continuously and at high speed, contacts on non-detached telephonic relay elements on a metal supply strip, said contacts being balls adapted to be welded on the elements of said supply strip to form contacts thereon, said apparatus comprising:

a support frame on which a metal strip with telephonic relay elements can be supported,

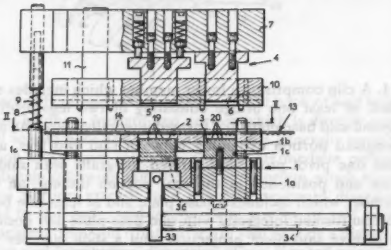
a container for storage of balls adapted to form contacts, said container being provided, at its bottom, with an outlet aperture through which a predetermined number of balls may be fed simultaneously,

a movable distributor slide provided with a number of holes equal to said predetermined number and each of which is sized to receive a single ball, said distributor slide being movable in alternating horizontal movement between a first extreme position wherein each hole receives a ball from said outlet aperture, and a second extreme position,

a fixed distributor support provided with a number of passages equal to said predetermined number and sized to permit a single ball to pass therethrough.

an electrode provided with an upper horizontal surface on which are formed a number of hemispherical recesses equal to said predetermined number, each recess being sized to receive therein substantially one half of a ball, said electrode being movable in alternating movable movement between a first position and a second position,

conduits connected at one end thereof to said passages of the distributor support respectively and having other ends which open above said electrode, the latter being movable in alternating horizontal movememt between said first position in which said recesses are located under said other ends of the conduits such that each receives a ball, and said second position wherein the recesses carrying the balls lie under the telephonic relay strip,



a counter-electrode driven in alternating vertical movement towards and away from the electrode in its second position.

the strip being advanced horizontally in steps on the electrode, each step being equal to the number of contacts to be welded simultaneously,

a finishing die spaced horidzontally with respect to the electrode in the direction of displacement of the strip, said finishing die being provided with an upper horizontal surface on which are formed a number of hemispherical recesses equal to said predetermined number, and a counter-die driven in an alternating vertical movement toward and away from the finishing die,

said relay elements being cut from the supply strip after the mounting and the shaping of the contacts.

3,992,763

METHOD OF MAKING POWDERED METAL PARTS

Robert Nelson Haynie, Northville, and Ramjee Pathak, Plymouth, both of Mich., assignors to Federal-Mogul Corporation, Detroit, Mich.

Filed Sept. 13, 1974, Ser. No. 505,702
Int. Cl.² B22F 3/24
U.S. Cl. 29—420.5 6 Claims

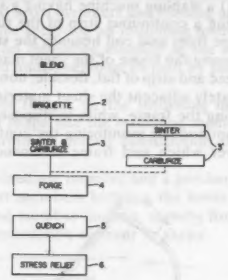
1. A process for obtaining a substantially fully dense, carburized, low alloy ferrous, powdered metal part comprising the sequential steps of:

a. briquetting a low alloy ferrous metal powder preform having a fixed uniform initial carbon content throughout both the case and inner core thereof, the briquetted preform having at least one surface thereof which in the final forged form is required to be of a certain case depth,

b. sintering said preform at a temperature from 2000°–2100° F,

c. carburizing said preform to substantially increase the initial carbon content thereof in said case by providing a controlled carbon atmosphere of rich endothermic gas and maintaining said preform in said controlled atmosphere for a predetermined period of time sufficient to obtain a desired case depth of final carbon content sub-

stantially greater than said initial carbon content of the case as well as the final carbon content of said inner core,



d. forging said preform at a temperature range from about 1600° to about 1750° F to a density of 99.6% to 100% that of wrought density to obtain a forged part,

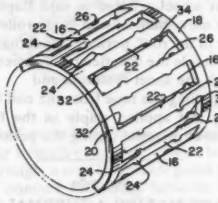
e. cooling said forged part by quenching to thereby obtain a desired case depth.

3,992,764

METHOD OF FORMING A ROLLER CAGE

Frank John Serasio, Torrington, Conn., assignor to The Torrington Company, Torrington, Conn.

Filed Sept. 22, 1975, Ser. No. 615,408
Int. Cl.² B21D *28/00*
U.S. Cl. 29—148.4 C **8 Claims**



1. A method of forming a cage for a bearing comprising: first, forming laterally separated longitudinal ridges on at least one flat side of a metal strip, then forming rectangular pockets having their long sides perpendicular to said ridges, then flattening the ridges to form projections extending into the pockets; and then cutting off a predetermined length of strip.

3,992,765

REGISTRATION SYSTEMS ADAPTED FOR USE WITH SNAP FASTENER ATTACHING MACHINE AND THE LIKE

Herbert M. Silverbush, Providence, R.I., and Philip B. Jensen, Seekonk, Mass., assignors to Rau Fastener, A Division of U.S. Industries, Inc., Providence, R.I.

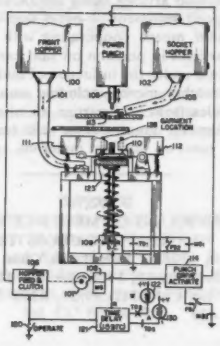
Continuation of Ser. No. 529,689, Dec. 5, 1974, abandoned.
This application Oct. 8, 1975, Ser. No. 620,825
Int. Cl.² B23P *19/04*
U.S. Cl. 29—200 P **20 Claims**

1. Registration apparatus for orienting a fastener having a logo-bearing front surface in one of a plurality of desired orientations, to enable emplacement of said fastener on a surface to assure that said logo is properly viewed when emplaced on said surface, comprising:

a. indicator means located on a surface of said fastener and indicative of the emplacement of said logo thereon,

b. at least one selectable projection located with respect to a fastener accommodating area and positioned such that said selectable projection when selected can be extended into the confines of said area,

c. means for rotating said fastener accommodating area and therefore said fastener solely about its axis to cause said selected projection to coact with said indicator means on said surface of said fastener when said fastener attempts to rotate past said extended projection; whereby said fastener can be positioned by said selectable projection, and



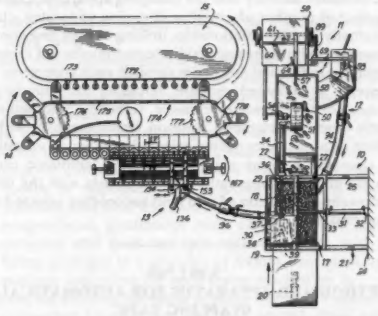
d. means responsive to the coaction of said fastener to cease rotation of said means for rotating, an operative to emplace the same in a selected orientation on said surface as determined by said position of said projection, as selected.

3,992,766

APPARATUS FOR PROCESSING ELASTIC ARTICLES

Donald G. Field, Lawrenceville, N.J., assignor to Youngs Rubber Corporation, Trenton, N.J.

Filed Aug. 26, 1975, Ser. No. 607,936
Int. Cl.² B23P *19/00*; B65G *47/04*; B23P *11/02*
U.S. Cl. 29—235 **9 Claims**



1. Apparatus for mounting a rimmed open mouth, distensible and inflatable article, such as a condom, on a test mandrel or the like of larger diameter than the undistended condom, comprising in combination, a frame, conveyer means movably mounted on said frame, a plurality of elongated carrier members having a diameter smaller than the diameter of said articles, said carrier members including a first end portion fixed to said conveyer means and a distal end portion spaced from said conveyer means, drive means operatively connected to

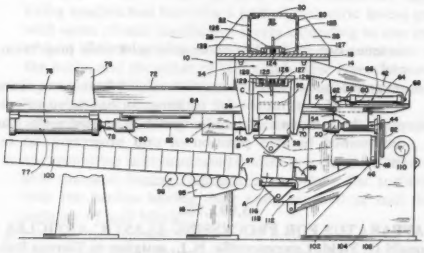
said conveyer means for moving said conveyer means progressively to advance successive said carrier members to a receiver station, transfer means having an exit end adjacent said receiver station for delivering fully unrolled articles closed end first to said receiver station along a path parallel to the longitudinal axis of said carrier means in timed relation to the movement of said carrier means, whereby the closed end of each successive article reaching said receiver station is impacted against the distal end of successive said carrier means at said station, said articles being advanced by said transfer means at a speed sufficient to evert said articles over said carriers, retainer means cooperating with said carriers for holding said articles in position on said carriers as the latter leave said station under the influence of said conveyer means, and article stretcher means including vacuum chamber for receiving articles from said carrier members expanding the same to a diameter greater than said test mandrels, and mounting the same on said test mandrels.

3,992,767

METHOD AND MEANS OF MULTIPLE DOWELING FOR LAMINATING CROSSTIES

Jesse M. Lewis, 6725 E. 24th, Tulsa, Okla. 74129

Filed July 10, 1975, Ser. No. 594,671
Int. Cl.² B21D *39/03*; B27F *7/02*
U.S. Cl. 29—429 **10 Claims**



9. A method of laminating a plurality of crossties comprising conveying a plurality of mutually parallel crossties to the proximity of a clamping apparatus, moving a selected number of the crossties laterally into the clamping apparatus, clamping said selected number of crossties clamping apparatus, clamping mutually parallel relationship, drilling at least one continuous transverse bore through said selected number of crossties, inserting an individual dowel pin through each transverse bore to provide a laminated crosstie, releasing the clamping engagement of the laminated crosstie, removing said laminated crosstie from the clamped position simultaneously with the position of a next succeeding selected number of crossties in said clamping position and removing the laminated crosstie from the clamping apparatus simultaneously with the drilling and doweling operation of said next succeeding selected number of crossties.

3,992,768

METHOD AND APPARATUS FOR AUTOMATICALLY STAPLING TAPE

Frank De Nicola, and G. Edward Vallender, both of Visalia, Calif., assignors to Berryfast, Inc., Tulare, Calif.

Continuation of Ser. No. 375,803, July 2, 1973, abandoned, which is a division of Ser. No. 201,034, Nov. 22, 1971, Pat. No. 3,771,708. This application Feb. 19, 1975, Ser. No. 551,144
Int. Cl.² B27F *7/22*
U.S. Cl. 29—429 **1 Claim**

1. The method of attaching roofing sheet material to a roof including the steps of

providing a moveable frame having attached thereto

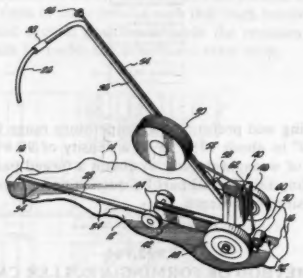
(a) a continuous strip of flat, flexible, nonmetallic tape formed into a coil so as to be rotatable about the coil axis and

(b) a stapling machine having a stapler head and

passing a continuous strip of the flat, flexible nonmetallic tape from said coil beneath the stapler head;

disposing the frame of the sheet material so that the stapler head and strip of flat, flexible, nonmetallic tape are immediately adjacent the sheet material;

moving the frame, while so disposed, along the roof while continuously monitoring the contour of the roof portion over which said frame is moved by providing a lever



pivotally attached to the stapler head and having a support wheel at one end thereof and a guide roller at the opposite end thereof which contacts the roof,

adjusting the position of said stapling machine by pivoting said support wheel relative to said stapling machine in response to movement of said guide roller as it monitors the contour of the roof, periodically actuating the stapling machine to staple the flat, flexible nonmetallic tape to the base through the sheet material; and

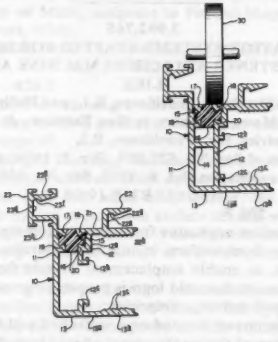
continuously pulling the tape from the coil by means of the successively last applied staple as the frame is moved along the sheet material during the periodic stapling.

3,992,769

METHOD OF MAKING A THERMAL BARRIER CONSTRUCTION ELEMENT

James C. Jackson, Bartlesville, Okla., assignor to Ethyl Corporation, Richmond, Va.

Filed Oct. 16, 1975, Ser. No. 622,951
Int. Cl.² B23P *17/00*
U.S. Cl. 29—416 **5 Claims**



1. A method of making a thermal barrier construction element or shape, comprising the steps of:

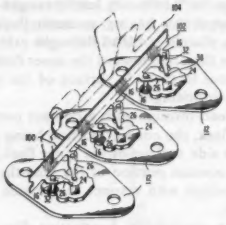
a. preparing a one-piece metal shape, which in cross-section has a pair of spaced apart members joined together by an end member and an intermediate member and a pair of upper and lower flanges spaced apart and opposite each other on the spaced apart members and forming an opening therebetween for receiving an insulating member;
b. slidably inserting an insulating member in the opening between the spaced apart members formed by the upper and lower flanges;
c. crimping the upper flanges on the insulating member, whereby the metal shape and the insulating member are locked together forming a unitary construction element; and,
d. removing the intermediate member and a portion of one of the spaced apart members between the lower flange thereon and the end member thereon, thereby forming a thermal barrier construction element or shape.

3,992,770

AUTOMATIC ASSEMBLY OF SEMICONDUCTOR DEVICES

Philip Lawrence Myers, Lehighton, Pa., assignor to RCA Corporation, New York, N.Y.

Filed Aug. 30, 1974, Ser. No. 501,964
Int. Cl.² B01J *17/00*
U.S. Cl. 29—591 **2 Claims**



1. A method of assembling a mount assembly including a stem comprising a header member and at least one lead extending therethrough, a semiconductor pellet mounted on said header, and a contact extending between and electrically secured to said lead and said pellet, said method comprising:
arraying a plurality of said stems with the leads thereof disposed in rectilinear, side-by-side, parallel relationship,
forming a contact assembly of thin sheet metal including a plurality of elongated contacts and a strip member connecting together said contacts,
bending said contacts adjacent to the points of attachment thereof to said strip member at right angles to said strip member to dispose corresponding portions of said contacts in linear alignment,
aligning different ones of said corresponding portions with different ones of said leads, and
engaging said corresponding portions with said leads.

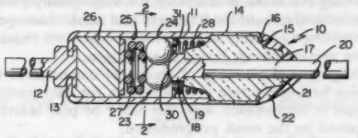
3,992,771

METHOD OF MAKING THERMAL LIMITER CONSTRUCTION

Emil Robert Piasko, Washington Township, Ohio, assignor to Emerson Electric Co., St. Louis, Mo.

Division of Ser. No. 472,413, May 22, 1974, Pat. No. 3,924,218. This application Sept. 22, 1975, Ser. No. 615,790
Int. Cl.² H01H *69/02*
U.S. Cl. 29—623 **5 Claims**

1. In a method of making a thermal limiter construction having a casing provided with an end plug carrying a conductor with an enlarged contact head inside said casing and against which spring controlled sliding contact means in said casing normally engages to conductively interconnect said casing and said conductor together, the improvement comprising the step of disposing a washer-like member in telescopic relation about said contact head and between said sliding contact means and a spring that acts between said



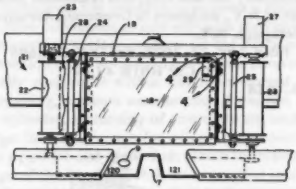
sliding contact means and said end plug to tend to move said sliding contact means away from said contact head whereby said washer-like member separates said spring from said sliding contact means.

3,992,772

ASSEMBLY STATION FOR PRINTED CIRCUIT BOARDS

Robert M. Scannell, St. Charles, Mo.; Willard E. W. Krick, Millstadt, Ill., and Edward R. Windish, Ferguson, Mo., assignors to McDonnell Douglas Corporation, St. Louis, Mo.

Filed Mar. 15, 1976, Ser. No. 667,204
Int. Cl.² H05K *3/30*
U.S. Cl. 29—626 **17 Claims**



1. An assembly station, which comprises:
a support means;
a translucent work area mounted to said support means;
illuminating means beneath said work area, said illuminating means directing light rays towards said work area;
a load roller rotatably mounted along a first end of said work area;
a take-up roller rotatably mounted on a second end of said work area;
guide roller means between each of said load and said take-up rollers and said work area, said guide roller means being aligned with said work area in a predetermined arrangement;
first drive means for rotating said load roller;
second drive means for rotating said take-up roller;
means for controlling said first and said second roller drive means in response to the position of a mask disposed between said load and said take-up rollers;
a programmed, continuous mask carried by and movable between said feed and said take-up rollers, said mask being arranged in a plurality of frames, said mask having position indicators for each frame marked on it;
means for reading the mask position indicators operatively connected to said first and said second drive control means;
a pair of stacked parts supply tables rotatably mounted to said support means, a first one of said table pair having an opening in it for permitting access to a second one of said table pair; and
means for driving said tables sequentially as said mask moves from frame-to-frame across said work area.

11. A method of constructing printed circuit boards, comprising:

programming a mask by presenting a plurality of frames along the mask, each frame having a plurality of indicators on it, said indicator plurality including at least two frame position indicators, and indicators for showing the order of part insertion for the printed circuit board;

inserting the mask in a device for sequentially presenting individual ones of the frames of said mask to an operator;

assembling a plurality of electrical components required for the printed circuit board construction;

packaging said plurality of electrical components in part bins having discrete compartments for each component type in accordance with the order of part insertion required by the mask programmed;

arranging the part bins from said packaging step as a unit for transport to said device;

inserting the part bins into said device, said device adapted to receive said part bins and to permit presentation of individual compartments of said part bins in sequence with individual ones of the frames of said mask;

advancing said mask and said part bins sequentially at said device; and

inserting components from said part bins in the printed circuit board in accordance with the indicators on said mask.

3,992,773

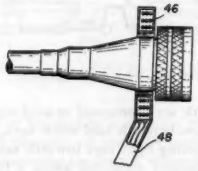
MAGNETIC FORMING PROCESS FOR JOINING ELECTRICAL CONNECTORS AND CABLES

Morris V. Duffner, Garden City, and Alexander Mintz, Smithtown, both of N.Y., assignors to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed Apr. 21, 1975, Ser. No. 569,690

Int. Cl.² H01R *43/04*

U.S. Cl. 29—628 **9 Claims**



1. The process of preparing an electrical cable for mating with a connector, said process comprising the steps of:

supporting at least one electical conductor by an insulate;

providing an outer, tubular electrical conductor over said insulate;

splitting at least one end of the outer conductor;

installing an insulate cover over the outer conductor up to the area of the split end thereof;

folding back the split end of the outer conductor over the insulate cover;

locating a ring over the folded back split end of the outer conductor;

returning the split end back over the ring;

locating a tubular casing over said insulate cover until a portion thereof is placed such that its inner walls are in close proximity to the folded back split end of the outer cover; and applying a high impulse of current to a coil about the aforementioned portion of the casing to produce a magnetic field of high intensity between the coil and the casing and eddy currents in the casing whereby an inward force is created to conform the casing to the sandwich of outer conductor, ring, outer conductor and insulate cover and integrate such elements as a sealed unit having good mechanical and electrical integrity.

3,992,774

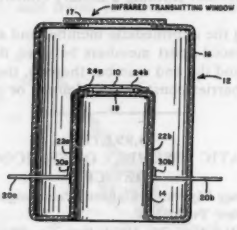
METHOD FOR FABRICATING LEAD THROUGH FOR DEWAR FLASK

Gordon J. Burrer, Wayland, and Gene A. Robillard, Stoneham, both of Mass., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Sept. 19, 1975, Ser. No. 614,803

Int. Cl.² H01R *43/00*

U.S. Cl. 29—628 **3 Claims**



1. In a process for fabricating lead-throughs in photodetector mounting apparatus having an outer flask and an inner flask in which a plurality of lead-throughs extend through the side of the outer flask and toward the inner flask in a direction essentially normal to the side surface of the inner flask, the improvement comprising:

providing a lead-through with a contact portion proximate the inner flask, the contact portion being essentially parallel to the side surface of the inner flask;

drawing the contact portion of the lead-through out of its normal position with respect to the side surface of the inner flask;

depositing an electrically conductive film over the side surface of the inner flask;

selectively removing portions of the electrically conductive film to provide an electrically conductive path on the side surface of the inner flask, the conductive path being aligned with respect to the normal position of the contact portion of the lead-through;

allowing the contact portion of the lead-through to assume its normal position; and

bonding the contact portion of the conductive path.

3,992,775

ELECTRIC SHAVER WITH ADJUSTABLE SKIN-TIGHTENING MEANS

Jochem Jacobus De Vries, Drachten, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jan. 20, 1975, Ser. No. 542,351

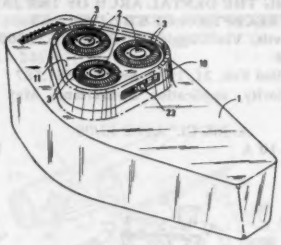
Claims priority, application Netherlands, Feb. 14, 1974, 742011

Int. Cl.² B26B *19/42*

U.S. Cl. 30—34.2 **5 Claims**

1. In an electric shaver including a housing, an electric motor mounted in said housing, a shear plate frame secured to said housing, at least one shear plate secured to said shear plate frame, and a cutter cooperating with each shear plate and coupled to said motor, the improvement in combination therewith of skin-tightening means comprising a rim adjacent said shear plate frame and having a top edge which surrounds said shear plate, said rim being movable for varying the height of said top edge relative to said shear plate, an adjusting member carried by said rim and movable on said rim transversely of said height direction, cam means formed on said shear plate frame as a slot means aligned angularly with respect to said height direction, and follower means on said adjusting mem-

ber, said follower means comprising a projection movable in and engaging said slot, whereby said transverse movement of



said adjusting member causes height movement of said member and of the rim carrying said member.

3,992,776

SHEATH FOR A KNIFE HAVING A HANDLE AND A FIXED BLADE

Rudolf Koppe, 27 Kenninghall Blvd., Streetsville, Ontario, Canada, and Sigfried Rosenkaimer, Erholungsstrasse 5-7, 565 Solingen-Merscheid, Germany

Continuation-in-part of Ser. No. 570,179, April 21, 1975, abandoned. This application Oct. 20, 1975, Ser. No. 623,961

Int. Cl.² B26B *29/02*

U.S. Cl. 30—151 **10 Claims**

1. The combination of a knife having a handle and a fixed blade and a sheath therefor in which said sheath comprises a pair of opposed elongated side walls of substantially opposite symmetry joined along their side and bottom edges to define a pocket open at the top for the snug registration of said knife blade therewithin, said side walls each having an inherent stiffness and resiliency, one said side wall having an aperture therethrough in a region spaced below the open top and having a configuration so as to receive in snug registration therewithin an intermediate portion of a spring metal band and so arranged as to support said spring metal band so that its width dimension extends substantially transversely of said elongated side wall, said spring metal band including a resiliently displaceable arched portion located interiorily of said pocked formation and so arranged at an angle to said intermediate portion as to extend downwardly and present the convex side of same towards the other of said side wall and to frictionally and resiliently bear against one flat surface of said knife blade, said metal band including an anchor portion located exteriorily of said pocket and arranged at an angle to said intermediate portion so as to substantially secure said intermediate portion of said metal band within said aperture against dislodgement, said knife handle having a generally symmetrical configuration about the plane of said knife blade and presenting to the upper edges of said sheath walls defining the open top of said pocket a shoulder formation located intermediately of the extent of said knife handle, said shoulder formation and said upper edges of said side walls having corresponding and complementary shaping whereby said shoulder formation is received in snug seated registration with said upper edges whereby said knife and sheath are releasably interlocked together.

3,992,777

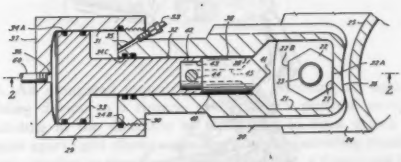
TOOL FOR RELEASING A NUT THREADED ONTO A BOLT

Lee E. Perkins; Robert D. Gray, and Ernest P. Parra, all of Houma, La., assignors to Nut Cutters, Inc., Houma, La.

Filed Mar. 22, 1976, Ser. No. 669,226

Int. Cl.² B26B *17/00*

U.S. Cl. 30—180 **7 Claims**



1. A tool for releasing a nut threaded onto a bolt, comprising a body having an opening adapted to be moved over the nut and a surface on the opening to support a flat side of the nut, and a bore connected at one end with the opening opposite the supporting surface, means on the body providing a cylinder to which the other end of the bore is connected, a rod longitudinally reciprocal within the bore toward and away from the opening, a piston on one end of the rod reciprocal within the cylinder, a plurality of cutting heads each having a cutting edge thereon, means for releasably connecting each head to the opposite end of the rod, means for maintaining the cutting edge of the head which is so connected in a predetermined rotational position with respect to the bore, and means for reciprocating the piston in order to move the cutting edge toward and away from cutting engagement with a flat side of the nut opposite the side supported by said surface, each head being of a different length so that the penetration of its cutting edge into a nut of given size may be predetermined by movement of the piston to one limited position in the cylinder as said cutting edge is moved toward the nut.

3,992,778

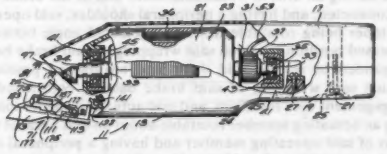
ELECTRIC CLIPPER

Richard L. Urbush, Racine, Wis., assignor to Andis Clipper Company, Racine, Wis.

Filed Apr. 28, 1975, Ser. No. 572,056

Int. Cl.² B26B *19/02*; H02K *5/14*

U.S. Cl. 30—216 **22 Claims**



13. A hair clipper including a housing, a motor located in said housing and having a rotatable shaft including a first portion and an end portion projecting from said first portion in eccentric relation to the rotary axis of said first portion, a drive member mounted in co-axial, surrounding relation to said end portion for relative rotation therebetween, and means retaining said drive member on said end portion including a tapered nose element having a base engaging said drive mem-

ber, and means securing said nose element on said end portion.

3,992,779

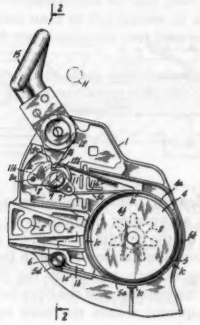
CHAIN BRAKE FOR CHAIN SAW

Michael R. Marks, Shelton, Conn., and James P. Strickland, Jr., Bourbonnais, Ill., assignors to Textron, Inc., Providence, R.I.

Continuation-in-part of Ser. No. 427,248, Dec. 21, 1973, abandoned. This application May 19, 1975, Ser. No. 578,414

Int. Cl.² B23D *57/02*; **B27B** *17/00*; **F16D** *49/04*

U.S. Cl. 30—381 **21 Claims**



1. In a chain saw having a clutch comprising a rotatable clutch drum and a chain-driving sprocket driven by said drum, a chain brake for stopping the cutting chain of the chain saw quickly, comprising a brake band wrapped spirally around said drum, means anchoring one end of said brake band, said brake band wrapping around said drum in the direction of rotation of said drum, operating means operably connected to the other end of said brake band and movable between a released position in which said brake band is released from said drum and an applied position in which said brake band is applied to said drum and actuating means normally retaining said operating means in released position and actuatable to move said operating means to applied position while said drum is rotating, whereby said brake band is brought into engagement with said drum to grip and snub the drum quickly to a stop, said operating means comprising an operating member rotatable about an axis parallel to the axis of said drum and having an arm to which said other end of the brake band is connected, and having a peripheral shoulder, said operating member being rotatable through a selected angle between a released position in which said wrapping of said brake band is expanded to release said drum and an applied position in which said wrapping of said brake band is contracted into engagement with the drum, and said actuating means comprising an actuating member rotatable about an axis parallel to the axis of said operating member and having a peripheral shoulder engageable with said shoulder of said operating member, the sum of the radii of said shoulders of said members from their respective axes being greater than the distance between the axes of said members, whereby in movement of said members between released position and applied position said shoulders have an interference engagement with one another to retain said members in the position to which they are moved until a force is applied to move them to the other of said positions.

3,992,780

MOUTH IMPLANT, A METHOD OF INSERTING THE IMPLANT IN THE MOUTH, AND A TOOL FOR MACHINING THE DENTAL ARCH OF THE JAW FOR RECEPTION OF THE IMPLANT

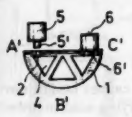
Imre Herskovits, Via Gaggini da Bissone 6, 6900 Lugano, Switzerland

Filed Feb. 21, 1975, Ser. No. 551,587

Claims priority, application Switzerland, May 9, 1974, 6469/74

Int. Cl.² A61C *13/00*

U.S. Cl. 32—10 A **11 Claims**



1. An endoosseous implant which comprises a base, a pair of upstanding spaced parallel side plates of thin metal of substantially uniform thickness, said plates being disposed at a distance from each other equal to the distance between two spaced parallel slots cut in the middle portion of each side part of the cortical jaw bone in which said plates are to be inserted, said implant being U-shaped in a sectional plane perpendicular to the planes of said plates, and means on said base for receiving at least one stump for at least one artificial tooth.

3,992,781

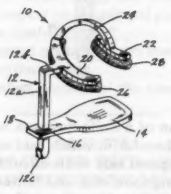
ANTERIOR COTTON ROLL HOLDER

Jack E. Sturdivant, Oakwood Road, Rte. No. 4, Ames, Iowa 50010

Filed Dec. 15, 1975, Ser. No. 640,936

Int. Cl.² A61C *5/12*

U.S. Cl. 32—35 **7 Claims**



1. An anterior cotton roll holder comprising,

an inverted L-shaped supporting post consisting of a vertical leg portion and a horizontal leg portion having an outer free end,

a lower chin clamping portion slidably secured to said vertical leg portion,

a first elongated arcuate cotton roll supporting portion having first and second ends secured to the outer free end of the horizontal leg portion of said post,

a second cotton roll supporting portion of arcuate shape concentrically positioned with respect to said first cotton roll supporting portion,

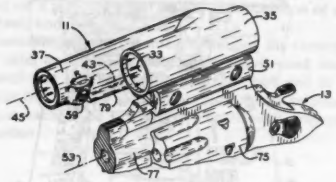
a vertically disposed inverted U-shaped connecting arm secured by one of its ends to said first cotton roll supporting portion, and secured by its other end to said second cotton roll supporting portion, and

cotton rolls secured to the underneath surfaces of said first and second cotton roll supporting portions.

3,992,782
LOW PROFILE GUN SIGHT

Glenn E. Rickert, Community State Bank Building, Huntington, Ind. 46750

Filed Mar. 27, 1975, Ser. No. 562,497
Int. Cl.² F41G 1/38; G02B 23/10
U.S. Cl. 33—246 4 Claims

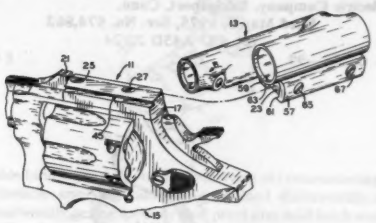


1. A firearm sight for attachment to a pair of generally parallel grooves on a firearm comprising a housing having two portions and having a pair of generally cylindrical axially extending apertures, one in each portion and displaced one from the other with the axes thereof extending generally parallel to one another, a reticle indicia, means supporting the reticle indicia in one of the apertures, means for superimposing a view of the reticle indicia and a target view through the other of the apertures including at least a collimating lens, a first fully reflective optical element and a second semitransparent optical element arranged in periscopic relation and fixed within the housing, mounting means integral with the housing portion having the said other aperture for securing the sight to the pair of generally parallel grooves on the firearm with the other aperture extending generally parallel to and in close proximity to the bore of the firearm barrel and with the axis of the firearm barrel bore and the axis of the other aperture defining a vertical plane, the said one aperture being displaced downwardly and outwardly from the other aperture with the axis thereof extending generally parallel to and removed from the vertical plane, first adjustment means for selectively moving the reticle indica relative to the housing in a direction generally parallel to the verticla plane, second adjustment means for selectively moving the reticle indicia relative to the housing in a direction generally perpendicular to the vertical plane the first and second adjustment means including first and second adjustment screws passing through the housing in generally mutually perpendicular directions for selectively moving the reticle indicia relative to the housing to thereby provide independent horizontal and vertical change of aim of the sight, the first and second optical elements providing a line of sight from the observer to the reticle indicia means which is deviated from the sight path through the housing other aperture in a direction oblique to both of the generally mutually perpendicular adjustment screw directions, one portion of the housing surrounding said one aperture extending in the direction of the one aperture axis beyond the other portion of the housing surrounding the said other aperture a distance sufficient to allow the first and second adjustment screws to extend from the one portion horizontally and downwardly respectively in a region beyond the axial extent of the other portion, and wherein deposits of lead, powder and other fouling materials may occur rearward of the muzzle when the handgun is discharged, and wherein the sight has exposed optical surfaces through which a target is viewed, the sight housing including shielding means for preventing the deposition of fouling materials on the exposed optical surfaces, one said exposed optical surface being located in the said other aperture near one end of the said other housing portion, the shielding means comprising an elongated rib extending from the said one housing portion with the direction of rib elongated lying generally parallel to the one aperture axis.

3,992,783
RECOIL RESISTANT MOUNTING SYSTEM

Norman D. Dunlap, New Bremen, Ohio, and Glenn E. Rickert, Huntington, Ind., assignors to Precision Tool & Machine Co., New Bremen, Ohio, by said Dunlap

Filed Mar. 27, 1975, Ser. No. 562,498
Int. Cl.² F41G 1/38
U.S. Cl. 33—250 4 Claims

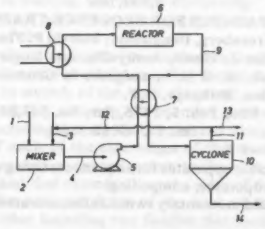


1. An elongated mounting base for attaching an optical sighting device to a firearm comprising a dovetail portion extending in the direction of elongation to form a pair of spaced apart sight clamp accepting grooves extending parallel to one another in the direction of elongation, a first recoil lug extending away from the dovetail portion and generally perpendicular to the direction of elongation for engaging a firearm to prevent movement of the base relative to the firearm when the firearm is discharged, a second recoil lug extending away from the dovetail portion in a direction opposite the first recoil lug and generally perpendicular to the direction of elongation for engaging the sighting device to prevent movement of the sighting device relative to the base when the firearm is discharged, the base being provided with at least one aperture disposed substantially midway between the grooves and extending generally perpendicular to the direction of base elongation, and means for attaching the base to the firearm comprising at least one mounting screw for passing through the aperture in the base and into the firearm.

3,992,784
THERMAL DEWATERING OF BROWN COAL

Eke Verschuur; Berend P. Ter Meulen; Teunis Van Herwijnen, and Johannes Boom, all of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed June 11, 1975, Ser. No. 585,914
Claims priority, application United Kingdom, June 19, 1974, 27190/74
Int. Cl.² F26B 7/00
U.S. Cl. 34—12 15 Claims



1. A process for upgrading solid material containing bound water and free or chemically bound carbon by disbonding at least part of the bound water which comprises the steps of (A) preparing a pumpable slurry of the solid material in water, (B) pressurizing the slurry at a temperature below 100° C, (C)

heat treating the slurry at a temperature of at least 150° C and at a pressure that is higher than the vapor pressure of water at that temperature, and (D) transferring at least part of the heat added in step (C) to the slurry prior to step (C).

3,992,785

HAIR DRYER HOOD

Gary S. McCachren, Asheboro, N.C., assignor to General Electric Company, Bridgeport, Conn.

Filed May 6, 1975, Ser. No. 574,862
Int. Cl.² A45D *20/24*
U.S. Cl. 34—99 **1 Claim**

1. A hair dryer comprising:
a first perforated liner having an opening to the interior thereof
the size of the opening being selected to permit the insertion of a person's head into the interior of the perforated liner,
support means having an interior opening of substantially the size of said opening to the interior of said perforated liner,
a second separate perforated liner having an opening to the interior thereof,
the size of the opening being selected to permit the insertion of a person's head into the interior and such opening being different sized from the opening of said first perforated liner,
mating mounting means on said support means and each perforated liner for permitting either said perforated liner to be removably mounted on said support means with the openings of said mounted liner and said support means aligned,
whereby the hair drying volume of the hair dryer may be readily changed by removing a liner of a first interior volume from said support means and mounting a liner of a second interior volume on said support means.

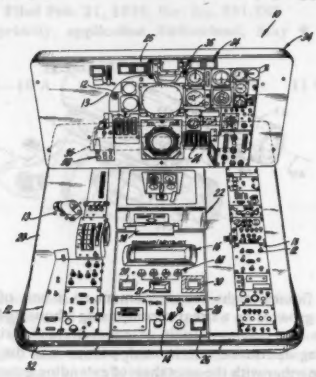
3,992,786

APPARATUS FOR SEQUENCE TRAINING

Samuel J. Greenberg, Douglaston; Marvin P. Fischthal, Smithtown; Elliot E. Blond, Amityville, and Roger A. Schaefer, Centereach, all of N.Y., assignors to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed Feb. 5, 1975, Ser. No. 547,352
Int. Cl.² G09B *9/08*
U.S. Cl. 35—9 R **7 Claims**

1. A portable apparatus for sequence training capable of use by a single operator, comprising:
holding and momentary switches for activation by an operator;
programming means for programming the apparatus to follow a particular training sequence requiring proper actuation of said holding and momentary switches;
indicating means adjacent each of said holding and momentary switches for indicating which of said holding and momentary switches is to be activated by the operator in the training sequence;
error recognizing means for recognizing activation of an improper one of said holding and momentary switches in the training sequence;
manifesting means responsive to said error recognizing means for manifesting the activation of an improper one of said holding and momentary switches in the training sequence; and



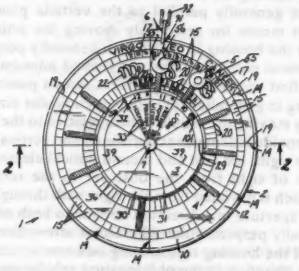
inhibiting means responsive to said error recognizing means for preventing further proceeding with the training sequence when an improper one of said holding switches is activated until the improperly activated holding switch is deactivated and said manifesting means is deactivated, and in the case of an improperly activated momentary switch, until said manifesting means is deactivated.

3,992,787

ASTROLOGICAL COMPARISON APPARATUS AND DAILY ASTROLOGY WHEEL

John Patrick Lynch, 1934 Portland Ave., St. Paul, Minn. 55104

Filed Dec. 15, 1975, Ser. No. 640,465
Int. Cl.² G09B *29/00*
U.S. Cl. 35—44 **8 Claims**



1. Astrological comparison apparatus for comparing the astrological characteristics for various individuals, comprising:
a. a base wheel having generally circular opposed front and back surfaces, said front surface having an annular outer portion and a generally circular inner portion concentric with said outer portion;
b. a generally circular inner wheel having opposed front and back surfaces, said inner wheel being generally sized to overlay only the inner portion of said base wheel front surface;
c. a spoked wheel including a hub portion and a first and second plurality of spoke members, said spoke members each radiating outwardly from a generally common cen-

ter located in the hub portion, said spoked wheel also including a positioning spoke member extending outwardly from the hub portion and having a point end, said first plurality of spoke members and said positioning spoke member containing visual differentiating means to differentiate them in appearance from said second plurality of spoke members;

d. an identifying member having a hub end and a point end, said identifying member being selectively movable over the front surface of said base wheel to overlay the point end on a selected point on the outer portion of said base wheel; and

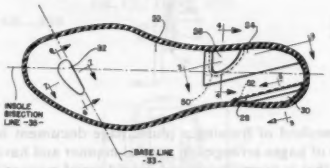
e. connecting means for interconnecting the center portion of said base wheel, said inner wheel, said identifying wheel and said identifying member hub end to one another in generally face-to-face concentric relationship to allow each to be selectively rotated with respect to one another.

3,992,788

INSOLE AND OUTSOLE CONSTRUCTION FOR ATHLETIC (TENNIS) SHOES, AND THE LIKE

William P. Orien, 8581 W. Pico Blvd., Los Angeles, Calif. 90035; Merton L. Root, and John H. Weed, both of 1848 Saratoga Ave., San Jose, Calif. 95129

Filed July 14, 1975, Ser. No. 595,848
Int. Cl.² A43B *7/22, 19/00*
U.S. Cl. 36—91 **9 Claims**



1. In an athletic shoe, or the like, having an outsole and an insole, and further having an upper extending from the outsole over and enclosing the insole; a tri-plane heel pad positioned on said insole at the medial aspect of the heel of the shoe to create a force against the plantar surface of the heel of the wearer simultaneously in all three body planes to prevent excessive subtalar joint pronation and elongation of the foot; and an elongated lateral heel pad positioned on said insole in the posterior lateral aspect of the heel of the shoe and displaced laterally from said tri-plane heel pad and essentially parallel to the medial edge thereof to assist said tri-plane heel pad in limiting the amount of eversion of the calcaneus and to reinforce the lateral heel area of the shoe.

3,992,789

FORWARD RELEASING SNOW SKI BOOT

Joseph K. Dikoff, No. 4 Privateer, Apt. 3, Marina Del Rey, Calif. 90291

Filed Nov. 4, 1975, Ser. No. 628,832
Int. Cl.² A43B *5/04*
U.S. Cl. 36—117 **10 Claims**

1. A forward releasing snow ski boot for use with a ski boot binding having a binding toe piece and comprising:

an upper boot;

a sole undermounted on said upper boot and including a forwardly facing arm supporting surface spaced in back of the toe of said sole;

a toe release mounted under said sole and including an enlongated pivot arm engaged on its rear extremity against said support surface and projecting forwardly therefrom to form on its forward extremity a toe tip for engagement with said binding toe piece, said arm being pivotable downwardly and rearwardly about said support surface; and

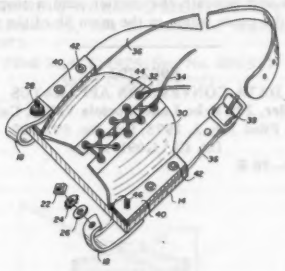
latch means latching the forward extremity of said pivot arm to said sole and responsive to a predetermined rearwardly and downwardly acting force acting on said toe tip to release said pivot arm for pivoting downwardly and rearwardly whereby said boot may be fitted in said releasable binding and upon the underlying ski encountering an obstacle applying said predetermined downwardly and rearwardly acting force to said pivot arm said latch means will release freeing said tip to pivot downwardly and rearwardly, thus releasing said boot to travel freely forwardly with respect to said toe piece.

3,992,790

SNOW SHOE HARNESS

Jule B. Frye, Valemount, Canada, assignor to The Raymond Lee Organization, Inc., a part interest

Filed Oct. 21, 1975, Ser. No. 624,537
Int. Cl.² A43B *5/04*
U.S. Cl. 36—125 **1 Claim**



1. A harness adapted to secure the boot of a user to a snow shoe in such manner as to allow increased mobility and reduced effort in walking, said device comprising:

a flat elongated bottom member engaging the underside of the sole of the boot;

two forwardly extending loops attached to the front end of the member and pivotally securing the front end of the member to strands of the snow shoe; and

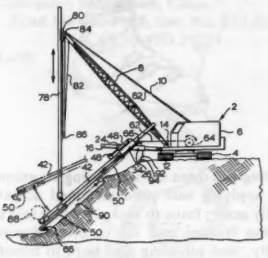
means detachably securing the member to the boot, the means including a strap that is secured along the entire length of each of the side edges of the member and is further secured at spaced points to the rear end of the member and that extends along the sides of the boot and around the rear periphery of the heel of the boot, to means further including two flexible thin sections having adjacent sides laced detachably together with the opposite side of each section being integral with the corresponding portion of the strap, and the means still further including first and second strips each strip overlying the corresponding opposite side of the corresponding section, the strips, sections and member being secured transversely together.

3,992,791

SLOPE GRADER WITH LONGITUDINALLY MOVABLE GUIDE FRAME

Americo Dean, R.R. No. 1 Belle River, Ontario, Canada

Filed Oct. 8, 1975, Ser. No. 620,556
Int. Cl.² E02F 3/46
U.S. Cl. 37—116 **11 Claims**



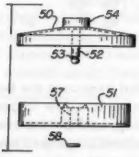
1. A grading attachment for a jib crane, comprising a substantially horizontal auxiliary jib mounted on the crane beneath its main jib, a carriage mounted for fore and aft movement along the auxiliary jib, an elongated guide frame supported by the carriage, said guide frame extending longitudinally forwardly from the carriage at an inclination thereto, and said guide frame having side rails passing through and slidably mounted in sleeves secured to said carriage whereby the guide frame is movable on its longitudinal axis relative to the carriage, a tool carrier mounted for movement in either direction longitudinally along the guide frame, an earthworking tool mounted to and beneath the carrier, and a suspension tie connecting the guide frame to the main jib of the crane.

3,992,792

DATA CONVERSION APPARATUS

Hale C. Keller, 208 Echo Lane, Portola Valley, Calif. 94025

Filed July 2, 1975, Ser. No. 592,509
Int. Cl.² G09F 11/04
U.S. Cl. 40—70 R **16 Claims**



1. An information storage and display apparatus comprising:

means forming a container, said container having

a top and a bottom member;

a pedestal centrally located within said container, said pedestal being supported at one end and having one end free with a disc-supporting surface extending generally perpendicular to the longitudinal axis thereof for receiving and supporting a disc;

a plurality of discs, each disc having a centrally located aperture, said aperture having a size and shape corresponding to the size and shape of the cross-section of said pedestal in a plane perpendicular to its longitudinal axis, for allowing the threading of said pedestal through said discs to store said discs about said pedestal when they are not in use;

means extending from said disc-supporting surface for retaining at least one of said plurality of discs on said surface when said latter disc is removed from among said plurality of discs and placed on said surface; and

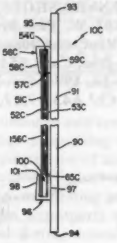
means for indexing selected portions of said latter disc as a visual aid when viewing said selected portions.

3,992,793

FRAME CONSTRUCTION FOR A PLURAL PAGE DOCUMENT

James T. Candor, 5440 Cynthia Lane, Dayton, Ohio 45429

Division of Ser. No. 460,745, April 15, 1974, Pat. No. 3,927,483, which is a division of Ser. No. 336,989, March 1, 1973, Pat. No. 3,807,071, which is a continuation-in-part of Ser. No. 271,925, July 14, 1972, abandoned. This application Nov. 4, 1975, Ser. No. 628,662
The portion of the term of this patent subsequent to Apr. 30, 1991, has been disclaimed.
Int. Cl.² G09F 1/12
U.S. Cl. 40—102 **10 Claims**



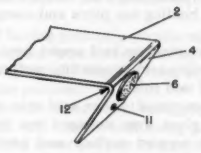
1. A method of framing a plural page document having a plurality of pages arranged in a serial manner and having data thereon that is normally viewed in said serial manner for said data to make reasonable sense comprising the steps of forming a frame with an open area therewithin, and framing said plural page document in said frame opening so that it appears that the first page of said document is the only page being framed at said open area of said frame but permitting all of said pages of said document to be manually fanned out through said open area to be serially viewed while still being carried by said frame so that said pages can be subsequently unfanned back into said open area in order for said first page to again appear to be the only page being framed by said frame.

3,992,794

CARPET ROLL IDENTIFICATION BRACKET AND INVENTORY CARD

Anthony C. Lazarus, 8715 First Ave., Silver Spring, Md. 20910

Continuation-in-part of Ser. No. 97,104, Dec. 11, 1970, abandoned. This application Sept. 22, 1972, Ser. No. 291,270
Int. Cl.² G09F 3/08
U.S. Cl. 40—309 **3 Claims**



1. A carpet roll storage inventory card and support means therefor comprising an elongated flexible flat plastic plate,

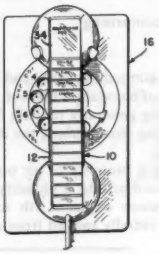
one end of said plate being round, and the other end thereof being generally bent at an acute angle with respect to said one round end to provide a relatively narrow substantially rigid supporting surface, said plate being adapted to be inserted between the windings of a roll of carpeting, generally circular Velcro securing patch means centrally arranged on one face of said supporting surface, and a flexible card larger in size than said supporting surface whereby a substantial area thereof projects beyond and is unsupported by said supporting surface and also having Velcro securing patch means similarly shaped and correspondingly located on one face thereof, said patch means being spaced from the edges of said rigid bent end and said flexible card, whereby said patch means are interengaged and interconnected to fixedly mount said card on said vent end to enable a projected and unsupported portion of said card to be grasped and pulled for card removal and to permit ready changes to be made in the inventory data inscribed on a face thereof and the card reattached thereto, said rigid supporting surface and said card attached thereto being disposed at an angle when arranged either above or below normal eye level to facilitate viewing thereof.

3,992,795

STICK-ON TELEPHONE NUMBER REFERENCE LIST HOLDER FOR HANDSETS

John F. Rettig, 2681 Murray Ridge Road, San Diego, Calif. 92123

Filed May 16, 1975, Ser. No. 578,167
Int. Cl.² G09F 3/00
U.S. Cl. 40—338 **1 Claim**



1. A telephone number reference list holder for the elongate hand portion of a telephone handset comprising:

a elongate rectangular envelope made of flexible material having an outer transparent layer and an inner layer having the dimensions substantially that of the flat outer surface of the intermediate portion of the handset;

a plurality of individual pockets formed in said envelope between said layers;

each pocket having an opening at one common longitudinal side;

a card on which may be applied a telephone number insertable in each pocket through said opening;

said outer layer adjacent the pocket openings extending beyond said card, and said card extending beyond said inner layer to facilitate replacement of said card by the fingers of the user;

an adhesive coating on the entire underside of said inner layer;

a pealable protective cover for said adhesive coating;

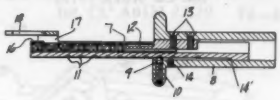
whereby upon removal of said protective cover the entire envelope may be adhesively mounted flatly to the outer surface of the hand portion of the telephone handset for ease of visibility and reference by the telephone user.

3,992,796

SYSTEM FOR INTRODUCING AND PLACING CASELESS PELLETS IN A FIRING APPARATUS

Roger Dorgnon, Avenue de St. Romains de Lerps, Saint Peray, France

Filed Nov. 29, 1974, Ser. No. 528,122
Int. Cl.² B25C 1/18
U.S. Cl. 42—90 **2 Claims**



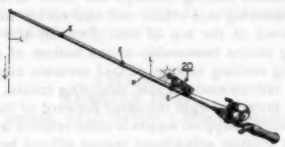
1. In a device for introducing, one at a time, propellant pellets into a firing apparatus from a prepackaged container holding a plurality of aligned pellets; a support member for receiving the pellet container; a handle member having a bore in which said support member is telescopingly disposed, said handle member being slidable over said support member so as to position a greater or lesser portion of said support member within said bore; a pusher fixed to said handle member and positioned so as to extend forward of said handle member within a projection of said bore to engage a terminal one of the pellets; and indexing means on said handle member and said support member to signal an amount of movement of said handle member over said support member approximately equal in length to the diameter of one of the pellets.

3,992,797

FISHING WARNING LIGHT DEVICE

Alger A. Kazakevich, 934 E. Gardenia, Madison Heights, Mich. 48071

Filed Sept. 3, 1975, Ser. No. 609,972
Int. Cl.² A01K 97/12
U.S. Cl. 43—17 **4 Claims**



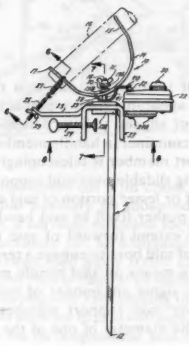
1. Improvement in a fishing warning light device having a battery operated light to warn a fisherman that a fish is biting on a fishing pole and electrical circuitry for lighting said light, said improvement comprising a lengthwise extending insulative base, said base carrying said circuitry, and means for removably mounting said device in an in-use position thereof on said pole so that said base is disposed lengthwise of said pole in said in-use position, said mounting means for said device arranged to squeeze said base against a stationary member on said pole so as to make a solid mechanical connection between said device and said pole, said mounting means comprising engaging means on said base for engaging said stationary member and a pinch type fastener for clamping on said pole, said fastener moveable lengthwise of said pole to push said base against said stationary member, whereby said squeezing of said base is accomplished by said fastener forcing

said engaging means into engagement with said stationary member.

3,992,798
FISHING POLE HOLDER

Anthony S. Schmitt, Sr., 4121 Springdale Ave., St. Louis, Mo. 63134

Continuation-in-part of Ser. No. 549,906, Feb. 14, 1975, Pat. No. 3,945,143. This application Jan. 5, 1976, Ser. No. 646,559
Int. Cl.² A01K 97/12
U.S. Cl. 43—17 **10 Claims**



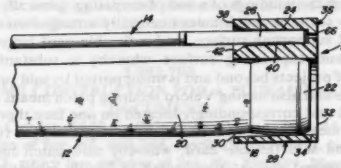
1. A fishing pole holder, comprising, in combination, a horizontal support means, a platform with a vertically extending hollow neck, said platform centrally located on and permanently affixed to said horizontal support means, an arcurate cradle for accommodating said pole, a rocker means permanently affixed to an arcurate segment on the underside of said cradle, said arcurate cradle and said rocker means being slotted for rockable mounting about the neck of said platform, a mounting means for securing said fishing pole holder to a horizontal or vertical supporting object, a spring-loaded retaining means passing through the neck of said platform, thereby securing said cradle and said rocker means movably to said neck at the top of said platform and securing said mounting means immovably to the bottom of said platform, permitting rocking motion of said arcurate cradle upon said platform independent of said mounting means, a pushbutton actuated horn and light mounted forward of the platform on said horizontal support means in close relation to said arcurate cradle, a tension adjustment means affixed between the aft end of said horizontal support means and the aft end of said cradle to permit adjustment of cradle position for particular fishing pole loading such that said arcurate cradle remains in sufficiently close proximity with said push-button actuated horn and light to assure actuation indicating a fish strike.

3,992,799
ROD SECTIONS RETAINING SOCKET & BRACKET

DuWayne E. Oakes, 8515 94th St., SW., Tacoma, Wash. 98498

Filed June 24, 1975, Ser. No. 589,681
Int. Cl.² A01K 87/02
U.S. Cl. 43—25 **8 Claims**

1. Apparatus for use in releasably fastening together in substantially parallel, side-by-side relation a plurality of rod sections selectively attachable one to another in end-to-end relation to form a fishing rod, the apparatus comprising a support member provided with a first socket means for receiving the handle section of a fishing rod, and a second socket means, separate from the first socket means, for receiving the male ferrule of a tip section of the fishing rod, the support member including a generally hollow portion forming the first

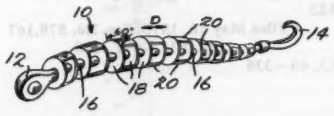


socket means, the portion having an opening, and an inner surface arranged extending from the opening for receiving a butt of the handle section of the fishing rod.

3,992,800
ACTION LURE

Ernest M. Neil, Clinton, Miss., assignor to Action Lure Company, Jackson, Miss.

Filed Mar. 23, 1976, Ser. No. 669,473
Int. Cl.² A01K 85/00
U.S. Cl. 43—42.24 **10 Claims**

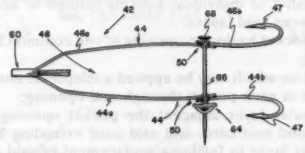


1. A fish lure comprising
a head,
a tail,
a flexible core connecting said head to said tail, and having a dimension of elongation thereof, a plurality of rib members extending generally radially from said core, said rib members being spaced along the dimension of elongation of said core,
means defining a plurality of air pockets for trapping air, said means comprising a plurality of shell members extending between adjacent rib members and attached thereto and radially spaced from said core.

3,992,801
FISHING HOOK ASSEMBLY

John C. McDiarmid, 706 E. Donaldson Ave., and Darrell F. Chapman, 730 Green St., both of Raeford, N.C. 28376

Filed June 23, 1975, Ser. No. 589,133
Int. Cl.² A01K 83/06
U.S. Cl. 43—44.8 **4 Claims**



1. A fishing hook assembly comprising:
a. a pair of shank assemblies extending in laterally spaced apart relationship so as to define a bait receiving and holding area generally between said shank assemblies;
b. each shank assembly including first and second independent and separate shank members wherein each of said

shank assemblies includes at least one fish hook associated therewith;

c. connecting means interconnecting said first and second shank members of each shank assembly, said connecting means including a shank receiving member means for receiving and holding each respective pair of first and second shank members of each shank assembly, each shank receiving member including opening means for adjustably receiving said first and second shank members therein and means for selectively securing said first and second shank members within said shank receiving member such that the shank members may be securedly held therein relative to each other;

d. bait holding means operatively associated with said fish hook assembly for holding a particular bait generally between said shank assemblies and in the bait receiving and holding areas defined therebetween; and

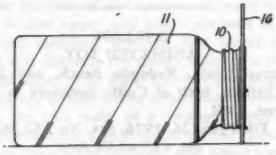
e. said bait holding means including front attaching means disposed about the end of said fish hook assembly opposite the end of said hooks for attaching the particular bait thereat, and a cross pin bait holding assembly means normally disposed transversely across said shank assemblies and through the body of the particular bait disposed therebetween, said cross pin bait holding assembly means including a removable cross pin means adapted to penetrate through the body of said bait being disposed in the bait holding and receiving area and to hold that portion of the bait about the fish hook assembly.

3,992,802

JAR LID MOUSE TRAP

Landon La Rue, Box 918, Mecca, Calif. 92254

Filed July 7, 1975, Ser. No. 593,665
Int. Cl.² A01M *23/20*
U.S. Cl. 43—61 **5 Claims**



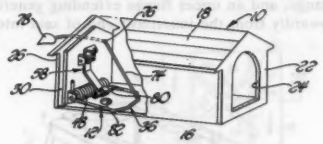
1. A mouse trap incorporated with a lid which is adapted to be attached to a conventional screw threaded jar, said trap including a mouse size opening formed in said lid, a stationary plate mounted in overlying relationship to the outside of said lid, said plate having an opening aligned with said opening in said lid, said plate having a pair of opposite side edges forming a pair of vertically directed tracks, a trap door mounted for sliding vertical movement along said tracks between an elevated open position above said openings and a downward closed position overlying and closing said openings, a vertically directed bait holder mounted on the inside of said lid, said bait holder having at its lower end a horizontally directed platform adapted to hold bait thereon, the upper end of said bait holder being pivotally connected to the inside of said lid and the lower end of said bait holder being free, so that the lower end of said bait holder is adapted to be pivotally moved in a horizontal direction upon contact of a mouse with bait disposed on said platform, said stationary plate having an outwardly directed ledge normally supporting the lower edge of said trap door to hold said trap door in elevated open position, and a horizontally directed trip member attached at one end thereof to the lower part of said bait holder, said trip member extending through said lid and stationary plate to a point directly adjacent to the inner side of said trap door, so that pivotal movement of said bait holder moves the lower edge of said trap door horizontally outwardly beyond said ledge, whereby said trap door is released for downward movement by force of gravity to closed position upon pivotal movement of said bait holder resulting from contact of a mouse with bait disposed on said platform.

3,992,803

MOUSE TRAP

Robert Dennis Kaiser, 48775 Pontiac Trail, Wixom, Mich. 48096

Filed Mar. 20, 1975, Ser. No. 560,219
Int. Cl.² A01M *23/30*
U.S. Cl. 43—83 **3 Claims**



1. A trap for mice and other rodents, comprising; a member for providing a passageway of sufficient length to receive and retain a rodent therewithin, a ground level access provided at one end of said passageway member and a back wall member provided at the other end and for closure thereof, a spring loaded bail wire trap mechanism mounted wholly upon said passageway, and said passageway member having enclosing and restrictive wall surfaces sufficiently closely spaced to preclude other than a frontal ground level approach by a rodent attracted into said passageway member and relatively towards said trap mechanism, said passageway member having upper, side and bottom walls providing said enclosing and restrictive wall surfaces and being formed to receive and retain said back wall member in fixed engagement therewith and with said trap mechanism pre-assembled and mounted thereon, said trap mechanism including a spring loaded bail wire pivotally mounted on said back wall member near the lower edge thereof, a bail wire catching and tripping member pivotally mounted on said back wall member and having a weighted end receptive of rodent attracting bait, an access hole through said back wall member and a cable connection through said hole and engaged to said bail wire for drawing said bail wire up against said back wall member and into catching engagement with said catching and tripping member, whereby said trap mechanism is wholly contained and provided upon said back wall member.

3,992,804

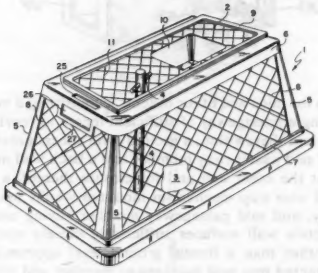
LOBSTER TRAP

Dominick J. Senese, 1522 Revere Circle, Schaumburg, Ill. 60172

Continuation of Ser. No. 441,552, Feb. 14, 1974, abandoned.
This application Feb. 11, 1975, Ser. No. 548,974
Int. Cl.² A01K *69/08*
U.S. Cl. 43—100 **20 Claims**

1. A crustacean trap, comprising: a plurality of generally planar walls forming the interior of said crustacean trap therebetween; at least one of said walls being defined by a central panel and a continuous closed peripheral frame integrally connected with and extending outwardly from the edge periphery of said central panel; said central panel including an open mesh net material of woven strands with the interstices between said strands being substantially larger than the diameter of the strands; said peripheral frame having an inner layer of material, an outer layer of material, the peripheral edge portion of said panel between said inner and outer layers, and bonding means laminating said layers together with said peripheral edge portion of said panel therebetween; said peripheral frame comprising four straight portions serially interconnected to form a quadilateral frame having at least two straight portions parallel to each other; said panel being so

constructed that its strands are woven in a rectilinear grind diagonally oriented with respect to said straight portions so that two adjacent edge portions will form with the adjacent strands extending therebetween a series of increasing area triangles for rigid interbracing; three further walls as defined with respect to said one wall and forming with said one wall the four sides of the container, with adjacent straight frame portions being of one piece construction with each other; further including top and bottom members forming all of the walls of the crustacean trap with said side walls; the lower straight portion of each of said frames including in one piece, a lower generally vertically extending flange, an intermediate portion extending inwardly from the upper portion of said lower flange, and an upper flange extending generally vertically upwardly from the innermost end of said intermediate



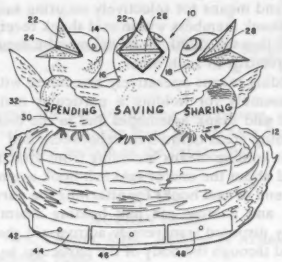
portion; said bottom member including a reinforced concrete slab having its edge portion, around its entire periphery, fitting within the area of said lower flange and intermediate portion; an elongated rigid securement member embedded at one end within said slab, extending generally vertically upwardly between and spaced from said side walls, and extending outwardly through said top at its opposite end; and means coupled with said opposite end of said securement member for securing said top tightly against the upper periphery of said sides, said top including a central panel of open mesh net material of woven strands with the interstices between said strands being substantially larger than the diameter of said strands and a closed continuous periphery frame of a downwardly opening U-shape comprising inner and outer layers of fabric having the edge portion of said open mesh net material laminated between said inner and outer layers, and said cover when in its closed position having the upwardly extending flange of said side wall frame within the interior of the downwardly extending U-shape; the remaining portion of the interior of said downwardly opening U-shape being filled with a closed pore synthetic resin rigid from; said top central panel including a lobster entrance means comprising an inwardly converging funnel extending through said open mesh net material.

18. A crustacean trap, comprising: four individual generally planar side walls, a top wall and a bottom wall forming the interior of said crustacean trap therebetween; at least one of said side and top walls having means for permitting entry of grown crustaceans within the crustacean trap and preventing their exit; said bottom wall being separable from said side and top walls; releasable connector means for selectively securing said bottom wall to said side and top walls; said four side walls of said crustacean trap being each sloped inwardly toward the top so that the structure of the four side walls and the top wall may be stacked with identical structures in a nesting relationship with their tops closely adjacent each other; said top and side walls, in the complete trap position, being parallel to each other; said bottom wall being of substantially greater density than said top and side walls.

3,992,805
BUDGETARY SAVINGS BANK

Rose G. Arkin, New York, N.Y., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed July 18, 1975, Ser. No. 597,032
Int. Cl.² A63H *33/00*
U.S. Cl. 46—2 **1 Claim**

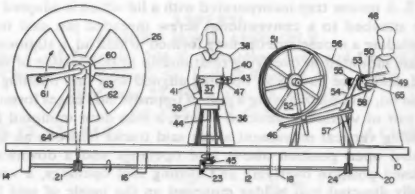


1. A toy bank for receiving coins for plural budgetary purposes comprising: a hollow base portion formed in the shape of a bird's nest; plural side by side drawers mounted slideably in said base portion for holding coins respectively for said different budgetary purposes; plural bird figures on said base portion, each bird figure being positioned above a different one of said drawers; each bird figure having an open beak defining a coin slot proportioned for receiving 25 cent pieces therethrough and chute means within each bird figure leading from the coin slot in each bird figure to the respective drawer below the bird figure.

3,992,806
ANIMATED TOY

Philip Warren Crain, Redondo Beach, and James Frank Woods, Yettem, both of Calif., assignors to Mattel, Inc., Hawthorne, Calif.

Filed Jan. 26, 1976, Ser. No. 652,365
Int. Cl.² A63H *3/40*
U.S. Cl. 46—116 **4 Claims**



1. An animated amusement device comprising, in combination:

a base;

a simulated machine apparatus located on said base and having a rotatable element;

means for rotating said element;

a plurality of cam surfaces located on said rotatable element and spaced from one another;

a figurine located on said base adjacent said rotating element, said figurine having an extending arm and a hand attached to an end of said arm;

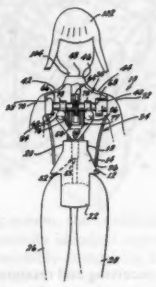
said hand being positioned in contact with said rotating element in the path of movement of said cam surfaces;

whereby rotation of said element undulates said hand.

3,992,807
GROWTH-SIMULATING FIGURE TOY

Jurgis Sapkus, Manhattan Beach, and J. Stephen Lewis, Pacific Palasades, both of Calif., assignors to Mattel, Inc., Hawthorne, Calif.

Filed Mar. 17, 1975, Ser. No. 558,764
Int. Cl.² A63H 11/00
U.S. Cl. 46—119 6 Claims



2. A growth-simulating figure toy, comprising:

1. a lower torso member including a waist member having a lower portion of a first predetermined girth and an upper portion of a second predetermined girth less than said first predetermined girth;

2. a pliable rubber-like upper torso member having a waist member slidably mounted on said lower torso waist member, said upper torso waist member conforming to the shape and girth of said lower torso waist member regardless of the location of said upper torso waist member with respect to said upper and lower portions of said lower torso waist member, whereby said upper torso waist member will simulate the pudgy waist of a pre-teenager when said upper torso waist member is in position of said lower portion of said lower torso waist member and will simulate the trim waist of a teenager when said upper torso waist member is in position on said upper portion of said lower torso waist member, said upper torso member including a neck portion and a pair of shoulder openings; and

3. means connected to said upper torso member for moving said upper torso waist member from one position to another position on said lower torso waist member, said means connected to said upper torso member comprising:

A. an actuator bar having a lower end slidably mounted in said lower torso member, an upper end connected to said upper torso neck portion and an intermediate portion lying in a transverse plane passing through said shoulder openings;

B. crankshaft means connected to said intermediate portion of said actuator bar for raising and lowering said actuator bar when said crankshaft means is rotated, said crankshaft means having an end extending through one of said shoulder openings; and

C. lever means connected to said one end of said crankshaft means for imparting rotation thereto.

3,992,808
MUSHROOM TRAY

Paul G. Stengel, R.D. No. 2, Kennett Square, Pa. 19348

Filed Dec. 31, 1975, Ser. No. 645,558
Int. Cl.² A01G 1/04
U.S. Cl. 47—1.1 5 Claims

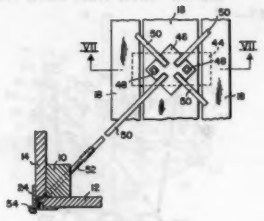
1. A tray for compost used in the cultivation of mushrooms, comprising:

A. four upright legs rectangular in transverse section,

B. a pair of opposed side panels and a pair of opposed end panels extending about said legs to cojointly define a rectangular enclosure,

C. a bottom for said enclosure disposed a substantial distance above the lower extremities of said legs, said bottom including a plurality of laterally spaced members, each of which is connected to said panels to provide support for the compost in said tray, the spaces between adjacent ones of said members providing slots adapted for exposing the base of the compost in said tray ambient conditions,

D. a leg brace of L-shape in transverse section at each corner of the tray, said leg brace operatively overlying



respectively the outwardly facing surfaces of the leg and being of a length substantially corresponding to that of the leg, an upper section of the leg brace being disposed in close overlying relation to the ends of the associated side and end panels, and a lower section of the leg brace being disposed in spaced relation to the associated leg,

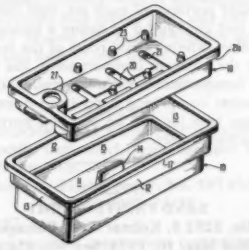
E. means interposed between said lower section and the leg brace and said leg for enabling said lower section of the leg brace to be operatively drawn tight against said leg, and

F. cross bracing disposed in close overlying relation to the bottom of said tray, each end of said cross bracing extending diagonally through one of said legs and the associated one of the leg braces for connection thereto.

3,992,809
HYDROPONIC UNIT

Clarence E. Chew, 1840 Townsend Blvd., Jacksonville, Fla. 32211

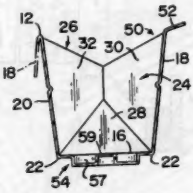
Filed May 12, 1975, Ser. No. 576,547
Int. Cl.² A01G 7/02
U.S. Cl. 47—62 9 Claims



1. A hydroponic unit comprising an elongated first receptacle having top and bottom walls and upstanding integral side and end walls, an intermediate inwardly offset wall, an aggregate tray arranged to be supported on said inwardly offset wall and by the top edges of said side and end walls in which an aggregate is to be supported for a crop to be grown, a reservoir between said tray and said bottom wall, a plurality of means defining openings in said tray, at least one of said last named means having filter means for preventing entry of said aggre-

gate into said reservoir and to facilitate circulation of atmospheric air to said aggregate, a pump in said reservoir positioned below one of said opening in said tray, means extending upwardly through said aggregate serving as an access to said reservoir and said pump, and nutrient soaker means extending from said pump to the top position of said aggregate to provide nutrient circulation in said hydroponic unit.

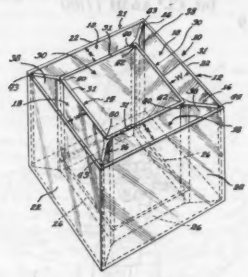
3,992,810
SEEDLING TRAY
Alvan C. Kimball, Wadsworth, Ohio, assignor to Lakeland Enterprises, Inc., Tampa, Fla.
Filed Mar. 21, 1975, Ser. No. 560,343
Int. Cl.² A01G 9/02; B65D 1/00
U.S. Cl. 47—77 **6 Claims**



1. A multi-compartmented container for the growth of seedlings comprising at least one channel comprising base means extending along the length thereof, side wall means comprising a side wall portion movably connected to each oppositely disposed longitudinal edge of said base means, each of said side wall portions positionable in a substantially upstanding position relative to said base means and to one another, so as to at least partially define said channel means, divider means comprising a plurality of divider portions formed on said side wall means, said plurality of divider portions disposed in engageable divider portion sets, each divider portion set comprising at least two divider portions, each mounted in corresponding relation to one another on oppositely disposed side wall portions, said divider portion sets disposed in spaced relation to one another along the longitudinal dimension of said base means and said side wall means whereby substantially adjacent and segmented compartments are defined between said successively disposed sets of divider portions, means to prevent the roots of the seedlings from passing between adjacent compartments, said means comprising a tongue and groove connection along all the mutually engaging divider portions of each set, said connection being dimensioned and configured to define a locking engagement with one another, whereby said roots of the seedlings cannot pass between the adjacent compartments, the base means of each of said compartments including collection means, said collection means comprising a recessed compartment area and a drainage hole located on a raised portion of said recessed compartment area.

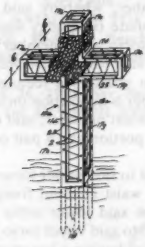
3,992,811
SAND PAINTING UNIT
Bernard Yellin, 5252 S. Kolmar Ave., Chicago, Ill. 60632
Filed Mar. 10, 1975, Ser. No. 556,678
Int. Cl.² A01G 9/02
U.S. Cl. 47—69 **9 Claims**

1. A sand painting unit comprising an outer container member having a continuous transparent upstanding wall and a bottom horizontal wall connected to said upstanding wall, an inner container having a continuous upstanding wall and a bottom horizontal wall connected to said last mentioned upstanding wall, said bottom wall of said outer container having means for receiving and positioning the inner container relative to said outer container so that the upstanding wall of said inner container is spaced from the upstanding wall of said outer container to define a reduced width area between said upstanding walls, said reduced width area being closed at the bottom and open at the top, said reduced width area forming



a container means receiving and retaining grains of sand, some of which are in various colors so that when said grains of sand are blended, interspersed and/or mixed, pictures or designs may be formed therefrom and viewed through said upstanding walls of said outer container member.

3,992,812
TOPIARY SHAPING FRAME
Alvin Edward Horowitz, 2320 SW. 23 Ave., Miami, Fla. 33145
Filed Apr. 21, 1975, Ser. No. 569,798
Int. Cl.² A01G 17/06
U.S. Cl. 47—45 **4 Claims**

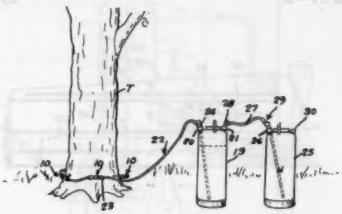


1. A two-piece topiary shaping frame comprising in combination, a front framework portion defining a front surface area for use as a guide in trimming a growing plant to a predetermined front configuration, a rear framework portion defining a rear surface for use as a guide in trimming a growing plant to a predetermined rear configuration, a plurality of side framework portions rigidly secured with respect to and extending between and separating said front and rear surface portions and defining therewith a peripheral surface area for use as a guide in trimming a growing plant to a predetermined side peripheral configuration, and means for removably securing lower end portions of the shaping frame to the earth in which a plant may be grown, said lower end portions securing means comprising a plurality of rigid prongs extending downwardly of the lower end of said shaping frame and being adapted to be pushed into the earth for self support, said side framework portions comprising releasable attaching means permitting complete separation of said front and rear framework portions substantially midway therebetween to allow the fitting of said shaping frame about and removal from a growing plant, selectively.

3,992,813
TREE TREATING SYSTEM

David C. Freshel, 19196 Bretton Drive, Detroit, Mich. 48223

Filed July 7, 1975, Ser. No. 593,376
Int. Cl.² A01G 29/00
U.S. Cl. 47—57.5 8 Claims

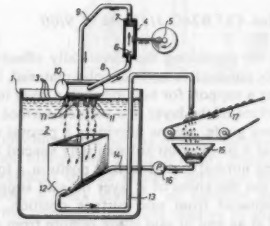


1. In a tree treating system, the combination comprising
a plurality of substantially identical injector assemblies,
each said injector assembly comprising a pipe insertable in an opening in a tree,
a female quick disconnect one way valve socket connected to said pipe,
and a male connector plug thereon also connected
a plurality of substantially identical hose assemblies,
each said hose assembly comprising a flexible length of tubing,
a female quick disconnect one way valve socket connected to one end of said tubing,
and a male connector plug connected to the other end of said tubing,
such that each said injector assembly may be placed in an opening in a tree and said injector assemblies may be connected in series by connecting the female connector socket of said first injector assembly to the plug of a hose assembly, connecting the female connector socket of said hose assembly to the plug of the next adjacent injector assembly, and similarly interconnecting successive injector assemblies by hose assemblies.

3,992,814
METHOD FOR SORTING SEEDS

Mats Bernhard Hagner, Blabarsvagen 19, 902 35 Umea, and Karl Lennart Wendt, Stocksjo, 910 26 Umea, both of Sweden

Filed May 19, 1975, Ser. No. 578,854
Claims priority, application Sweden, May 17, 1974, 74066325
Int. Cl.² A01G 1/00
U.S. Cl. 47—58 7 Claims

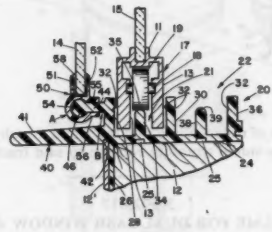


1. A method of sorting a large quantity of seeds to determine which have germinated, comprising the steps of: keeping the seeds under conditions well adapted for germination of such seeds for a duration sufficient to start the germination process; disposing all seeds directly on the surface of a liquid carrying the seeds; and sorting out seeds having started the germination process, said sorting utilizing means within the liquid acting on parts projecting down into the liquid from the germinating seeds.

3,992,815
WINDOW SASH AND FRAME

William W. Potter, 1718 College Ave., SE., Grand Rapids, Mich. 49507

Filed Feb. 27, 1975, Ser. No. 553,461
Int. Cl.² E05C 7/02
U.S. Cl. 49—62 9 Claims



1. A window frame and sash adapted to be coupled to said frame comprising:
an integral frame member extruded of polyvinyl chloride including a floor and channel means extending upwardly therefrom for supporting a sliding window therein and including at least one exterior wall extending around the periphery of said frame and a mounting flange extending parallel to said exterior wall in an opposite direction;
an integral coupling means comprising a rod extending outwardly from said exterior wall and coupled to said exterior wall by a support member and extending substantially continuously around the periphery of said frame, wherein said frame member further includes a drip cap extending outwardly from said exterior wall intermediate said rod and said flange; and
a window sash extruded of polyvinyl chloride for supporting one of a window or screen and including an elongated circular socket extending substantially continuously around the periphery of said sash and adapted to engage said rod associated with said frame and including segments engaging opposite sides of said support member of said rod whereby said socket grips said rod and engages at least 270° around said rod for sealably and removably attaching said sash to said frame.

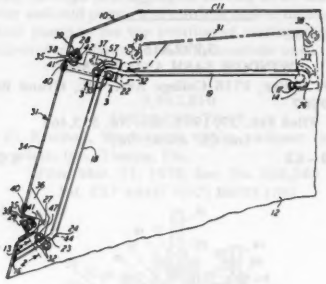
3,992,816
WINDOW TRACKING MECHANISM

Richard J. Skahill, Bettendorf, Iowa, assignor to J. I. Case Company, Racine, Wis.

Filed July 21, 1975, Ser. No. 597,419
Int. Cl.² E05D 15/38
U.S. Cl. 49—197 11 Claims

1. A window tracking mechanism comprising a window structure, a pair of spaced-apart and parallel tracks with each thereof having a bend therein at the same location along the length of said tracks, pairs of rollers rotatably supported on said window structure and with each pair of rollers having its rollers disposed in rolling contact with and on opposite sides of a respective one of said tracks for movably supporting said structure on said tracks, and a movable link connected between said rollers of one of said pairs of rollers to have one roller of said pair of rollers movably supported on said window structure for movement along said bend and relative to the

other roller of said one pair of rollers for positioning said one roller relative to said bend to releasably restrain movement of



said one pair of rollers along said track and thereby releasably secure said window structure relative to said tracks.

3,992,817

OUTER FRAME FOR DUAL SASH WINDOW ASSEMBLY

Shuichi Hosooka, Namerikawa, Japan, assignor to Yoshida Kogyo Kabushiki Kaisha, Japan

Filed Feb. 12, 1975, Ser. No. 549,424

Claims priority, application Japan, Feb. 18, 1974, 49-19770[U]

Int. Cl.² E05D *15/08*

U.S. Cl. 49—406 **2 Claims**

1. In a dual sash window assembly of the type comprising an outer frame including a header and a sill, and an exterior and an interior sash installed within said outer frame for independent horizontal movement relative to the same, each of said exterior and interior sashes having an inner frame including top and bottom horizontal members, the combination thereof with an exterior and an interior header rail projecting downwardly from said header and arranged in parallel spaced relationship to each other, an exterior and an interior sill rail projecting upwardly from said sill and arranged in parallel spaced relationship to each other, said top and bottom horizontal members of said exterior sash being adapted to engage said exterior header and sill rails, respectively, so as to be movable therealong, said top and bottom horizontal members of said interior sash being similarly adapted to engage said interior header and sill rails, respectively, so as to be movable therealong, a horizontal surface extending along and formed between the bottom edges of said exterior and interior sill rails, the distance between said horizontal surface and the bottom edges of said header being slightly greater than the height of each said exterior and interior sashes, and a windtight sealing strip of arcuate shape made of resilient material and mounted in a prescribed position between said exterior and interior sill rails, said windtight sealing strip having one end immovably secured against said horizontal surface and the opposite end disposed in slidable contact with said horizontal surface whereby, normally, said windtight sealing strip generally bulges upwardly for slidable contact with said bottom horizontal members of said exterior and interior sashes and wherein said exterior sill rail has an opening adjacent the bottom edge thereof, wherein said interior sill rail has a groove along the bottom edge thereof, said groove opening toward said exterior sill rail, and wherein said windtight sealing strip has a first projection at said one end which is engaged in said opening in said exterior sill rail, a second projection at said one end which is received in said groove in said interior sill rail, and a third projection adjacent said opposite end which is slidably received in said groove in said interior sill rail, said third projection being of smaller dimensions in the longitudinal direction then said second projection.

3,992,818

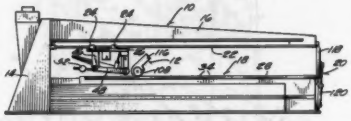
APPARATUS FOR GRINDING AND POLISHING A WELDED SEAM

Jorgen Clausen, Kolding, Denmark, assignor to Elektrogeno AS, Denmark

Filed Nov. 20, 1975, Ser. No. 633,640

Int. Cl.² B24B *7/00*

U.S. Cl. 51—3 **25 Claims**



15. A seam grinding and polishing apparatus comprising:

a frame structure including a bed structure for supporting welded sheets thereon with the face of the welded seam to be ground and polished facing upwardly, said frame structure further including an overhead support beam extending horizontally above said bed structure;

an overhead support structure mounted for horizontal travel along said overhead support beam including a drive means for driving said support structure back and forth on said beam;

a grinding mechanism supported by and depending from said overhead support structure, said grinding mechanism including a movably mounted endless grinding belt, a drive motor therefor and a retract mechanism for raising and lowering said grinding belt into and out of its seam grinding position, said grinding mechanism further including a vertical support column fastened to said overhead support structure and a support arm structure pivotally mounted on said vertical support column, said support arm having a grinding belt support wheel rotatably mounted on one end thereof on which one end of said endless grinding belt is mounted, said grinding belt drive motor mounted on said vertical support column with its drive axis in alignment with the pivotal axis of said pivotally mounted support arm.

3,992,819

APPARATUS FOR EQUALIZING THE RESISTANCE VALUE OF AN ELECTRICALLY CONDUCTIVE LAYER

Karl-Heinz Schmall, Baden-Baden, Germany, assignor to Precitec Gesellschaft fur Prazisionstechnik und Electronik, Germany

Filed Jan. 22, 1976, Ser. No. 651,277

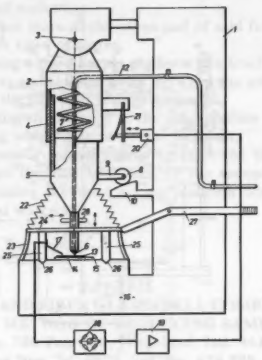
Claims priority, application Germany, Jan. 24, 1975, 2502961

Int. Cl.² B24C *3/32;* **B23K** *9/00*

U.S. Cl. 51—8 R **8 Claims**

1. Apparatus for equalizing the electrically effective value of an electrically conductive layer of solid material, the apparatus comprising a support for holding such a layer in position to present a surface of the layer in a defined surface position, an elongated tool guide, means providing a pivotal mounting for said guide at a pivot point substantially spaced from and on a notional line normal to said surface position, a tool operative to reduce the thickness of a layer on said support while said tool is displaced from said surface position, said tool being mounted at an end of said guide remote from said pivot point and having a working end presented towards said surface position, and the distance between said pivot point and said working end of said tool being many times greater than the distance between said working end and said surface position when said tool is operative, compensating means for maintaining the distance between said working end and said

surface position constant throughout movement of said guide about said pivot point for causing said tool to move over said



surface position, and means responsive to the electrical resistance of a layer on said support for effecting said movement.

3,992,820

GRINDING MACHINE INCLUDING MEANS TO SUPPLY COOLANT TO THE WORK AREA

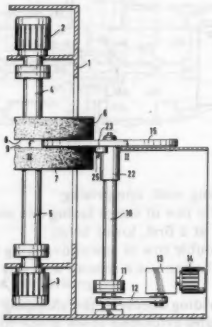
Rolf Suter, Safenwil, Switzerland, assignor to Schenker Maschinen AG, Schonenwerd, Switzerland

Filed Jan. 28, 1976, Ser. No. 653,031

Claims priority, application Switzerland, Feb. 25, 1975, 2365/75

Int. Cl.² B24B 7/16, 55/02

U.S. Cl. 51—118 **10 Claims**



1. In a machine for grinding objects, particularly springs, a combination comprising a pair of rotary grinding discs having grinding surfaces spaced in axial direction from each other and defining a work station; an element having a region mounted for turning movement relative to said work station intermediate said grinding surfaces, said region having a plurality of apertures each adapted to receive an object whose opposite ends are to be ground by contact with said grinding surfaces; and passage means including channels provided in said element and communicating said apertures with a source of fluid for supplying said fluid to said apertures.

3,992,821

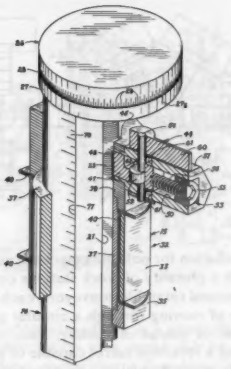
GEM FACETING MACHINE HAVING AN ADJUSTABLE FACETING HEAD SUPPORT ASSEMBLY

Douglas L. Hoffman, 3507 LaCrosse, Spokane, Wash. 99205

Filed June 6, 1975, Ser. No. 584,507

Int. Cl.² B24B 9/16

U.S. Cl. 51—125 **8 Claims**



1. In a gem faceting apparatus of the type including a base; a powered horizontal lap rotatably mounted to the base; and a faceting head located above the lap for supporting a gem in a prescribed angular relationship to the lap; an improved adjustable faceting head support assembly for holding the faceting head at selected elevations above the lap, comprising:

an upright mast of generally circular cross section mounted to the base and extending along a central mast axis;

a longitudinal open groove formed along said mast parallel to said central mast axis;

an elongated lead screw nested in said groove and freely rotatable therein about an axis parallel to said central mast axis;

collar means transversely encompassing a longitudinal portion of said mast and lead screw for holding the lead screw against the mast and for free longitudinal sliding movement over the mast and lead screw along said central mast axis;

a faceting head mounting sleeve encompassing a longitudinal portion of said mast and lead screw and supported by the collar means clear of the lead screw for free 360° rotation thereon in a selected horizontal plane about said mast and lead screw;

half nut means mounted to said collar means for lateral movement thereon relative to said lead screw between (a) a first position threadably engaging said lead screw to enable sliding movement of the attached collar means and faceting head mounting sleeve along the central mast axis only in response to rotation of said lead screw about its axis and (b) a second position disengaged from the lead screw to enable free sliding movement of the collar means and faceting head mounting sleeve along the central mast axis over the mast and lead screw;

actuator means on said collar means operatively engaging said half nut means for enabling selective engagement of said lead screw and half nut means; and

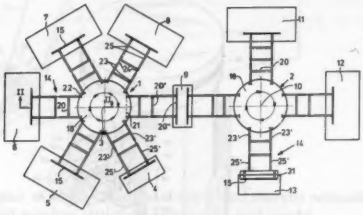
means for rotating said lead screw to locate the faceting head elevationally over the lap when said half nut means is engaged with said lead screw.

3,992,822

INSTALLATION FOR POLISHING PIECES OF CUTLERY

Rolf Faubel, Solingen, and Gerd Höller, Leichlingen, both of Germany, assignors to E. Siepmann & Co., Solingen, Germany

Filed May 13, 1975, Ser. No. 576,954
Claims priority, application Germany, May 14, 1974, 2423292
Int. Cl.² B24B *41/06*
U.S. Cl. 51—237 T 8 Claims



1. An installation for polishing pieces of cutlery in a circular path through a plurality of work stations comprising:

first and second rotatable conveyors, each of said conveyors capable of moving through a circular path for the transportation of pieces of cutlery, each of said conveyors including a rotatable turret capable of being driven intermittently about a vertical axis of rotation;

a plurality of equi-angularly spaced pivoting arms connected to each of said rotatable turrets, each of said pivoting arms including an inner arm section having one end articulated about a horizontal axis of said rotatable turret and capable of being driven radially outwardly about said horizontal axis, and an outer arm section articulated to the other end of said inner arm section and extending radially outwardly of said inner arm;

a workpiece holder connected to the free end of each of said outer arm sections;

swivelling means movble between a first position and a second position, said swivelling means being coupled to said inner and said outer arms for swivelling said arms and associated said holders and for holding said inner arm section in a substantially vertical position and for holding said outer arm section in a substantially horizontal position when said swivelling means is in said first position and for holding said inner and said outer arm sections in a radially extended position when said swivelling means is in said second position; and

a stop means between said inner arm section and said outer arm section for maintaining a minimum angle between said inner arm section and said outer arm section.

3,992,823

APPARATUS AND METHODS FOR SHAPING RECOIL PADS

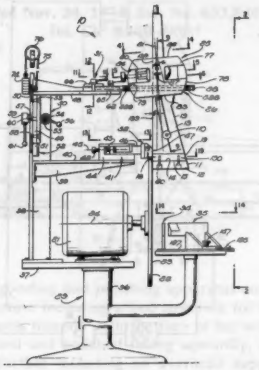
Frank A. Pachmayr, Los Angeles, and Jack R. Farrar, Whittier, both of Calif., assignors to Pachmayr Gun Works, Inc., Los Angeles, Calif.

Filed Feb. 23, 1976, Ser. No. 660,418
Int. Cl.² B24B *19/08*
U.S. Cl. 51—281 R 31 Claims

26. The method of abrading a recoil pad carried by the butt end of a gun stock comprising:

positioning a peripheral surface of the recoil pad in lateral engagement with an abrading surface of a power driven abrading unit; and

turning said gun stock about generally its longitudinal axis while maintaining the periphery of the recoil pad in engagement with said abrading surface, and while giving the sun stock and carried pad universal pivotal movement about a predetermined center which is fixed relative to said abrading surface and is spaced forwardly from the butt end of the gun stock in a direction toward its muzzle end, in a relation forming a surface on the periphery of the recoil pad which is aligned with and forms essentially a continuation of the outer surface of an adjacent portion of the gun stock.

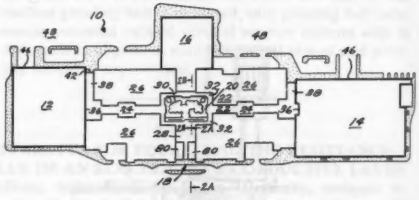


3,992,824

SHOPPING MALL

Kenneth C. Miller, Jr., Ruxton, Md., assignor to Monumental Properties Inc., Baltimore, Md.

Filed Mar. 22, 1973, Ser. No. 343,655
Int. Cl.² E04H *3/02*
U.S. Cl. 52—29 8 Claims



1. A shopping mall, comprising:

a first double row of stores facing one another across a first walkway at a first, lower level;

a second double row of stores overlying the first and facing one another across a second walkway at a second, upper level;

means providing access to the shopping mall and including path means extending from grade to intrusion into the first and second double rows at a level intermediate said first level and said second level, this path means including an access platform within the shopping mall at the intermediate level;

level transfer means extending from said access platform to the first level and to the second level for communicating the access platform with the respective first and second walkways;

an anchor store at one end of said first and second double rows of stores;

means defining a second platform at a level intermediate the first and second levels between the anchor store and the first and second walkways;

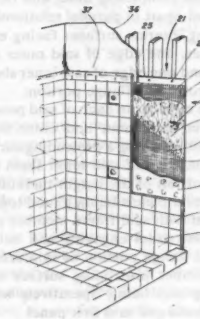
means defining an entrance to the anchor store communicating with the second access platform;
level transfer means extending from the second access platform to the first level and to the second level for communicating the second access platform with the first and second walkways;
another anchor store at the other end of said first and second double rows of stores;
means defining a third access platform at a level intermediate the first and second levels between the other anchor store and the first and second walkways;
means defining an entrance to the other anchor store communicating with the third access platform;
and level transfer means extending from the third access platform to the first level and to the second level for communicating the third access platform with the first and second walkways.

3,992,825

SHEET TILE AND FIBER GLASS SHELL COMBINATION AND METHOD OF PRODUCING SAME

Ronald E. May, 780 Pearl St., Whiteland, Ind. 46184

Filed Nov. 24, 1975, Ser. No. 634,589
Int. Cl.² A47K *3/16*
U.S. Cl. 52—35 **10 Claims**



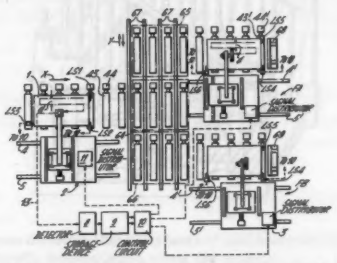
1. A construction comprising:
a plurality of upstanding wooden studs;
a fiber glass shell including a pair of fiber glass mats spaced apart by a layer of angel hair fiber glass with said mats and layer forming an integral assembly;
at least one panel of sheet tile with said panel including before attachment to said shell a plurality of individual tiles having edge portions adhesively secured to adjacent edge portions of adjacent tile;
waterproof adhesive means positioned between and securing together said panel to said shell;
a tab attached to said shell;
fastening means securing said tab to said wooden studs; and,
drywall mounted to said wooden studs and extending adjacent to said panel with said tab being positioned between said drywall and said wooden studs.

3,992,826

APPARATUS FOR AUTOMATICALLY DETECTING AND ELIMINATING FLAWS ON SLABS OR BILLETS

Eiichi Nakaoka; Takeharu Maekawa; Masahide Tokunaga, and Shozo Morishima, all of Kyoto, Japan, assignors to Shimadzu Seisakusho Ltd., Kyoto, Japan

Filed Apr. 8, 1975, Ser. No. 566,672
Claims priority, application Japan, Oct. 15, 1974, 49-119007
Int. Cl.² B24B *7/02*
U.S. Cl. 51—35 **6 Claims**



1. Apparatus for detecting flaws in a generally flat surface on a stationary object such as a metal slab or a billet and eliminating said flaws, comprising: a flaw detector for detecting flaws on or in said surface and producing a flaw signal for each flaw detected; means for effecting relative movement of said flaw detector over said surface under inspection so that said flaw detector traverses and scans said surface of said stationary object along a predetermined locus; a plurality of storage units for ordered storing of said flaw signals, each of said storage units storing the flaw signals resulting from scanning of one said surface by said flow detector; a plurality of flaw eliminators for eliminating said flaws detected by said flaw detector; means for allocating each of the objects that have been scanned by said detector and the corresponding one of said storage units which has stored the flaw signals resulting from scanning of each said object to a selected one of said flaw eliminators; and means for effecting relative movement of said selected flaw eliminator over said object allocated thereto so that said selected eliminator traverses the surface of said allocated object, following said predetermined locus over said surface; and said selected eliminator operates at positions along said predetermined locus in response to said ordered flaw signals stored in said storage unit allocated thereto, said signals to operate said selected eliminator occurring at a position along said predetermined locus corresponding to the position along said predetermined locus where said signal was produced by said flaw detector, whereby said flaws are eliminated by said selected eliminator from said respective allocated objects.

3,992,827

COPING ASSEMBLY WITH DEFORMABLE SEAL CLAMP

Philip L. Johnson, 1929 Stanford Drive SE., Grand Rapids, Mich. 49508

Filed July 7, 1975, Ser. No. 593,274
Int. Cl.² E04D *1/36*
U.S. Cl. 52—60 **5 Claims**

1. Means providing a watertight coupling between a wall and a roof comprising:
a clamp integrally extruded of aluminum having a generally vertical orientation along a wall and having first and second legs extending therefrom in spaced relationship for receiving therebetween planar seal means, at least one of said legs deformably movable to compress said planar sealing means between said legs, a deformable connec-

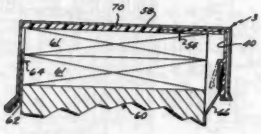
tion between said first leg and said second leg having a reduced thickness;

a protrusion extending from said first leg in a direction towards said second leg;

an indentation formed in said second leg at a location such that said protrusion of said first leg is aligned with said indentation when said sealing means is compressibly held between said legs;

a snap lock clip for attachment to a wall on a side opposite said clamp; and

a coping shaped to extend over a top of the wall and be secured at opposite ends by said clip and said clamp;



said coping being exterior of, fitting around the vertical extent of and under at least a portion of said clamp so as to generally enshroud said clamp for protection and shielding thereof, said coping also including flange means for securing said coping over top a wall; and

said snap lock clip and clamp each including extending means for interconnection with said flange means on said coping to hold said coping over the top of a wall without the necessity of using screws, nails, or other fasteners which would protrude therethrough to retain said coping in place.

3,992,828

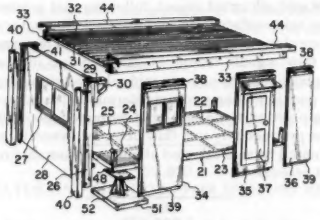
COLLAPSIBLE PREFABRICATED HOUSE

Takao Ohe, 13-11, Yako 5-chome, Tsurumi, Yokohama, Kanagawa, Japan

Filed Mar. 23, 1976, Ser. No. 669,613

Int. Cl.² E04H *1/343*

U.S. Cl. 52—69 **11 Claims**



1. A collapsible prefab house comprising relatively short poles erected at each corner of a rectangular floor panel, supports for supporting a roof panel connected to each pole from the outside through means of a pivotal member in a freely turnable manner, support brackets of a predetermined width fixed to the inner side of the top of each support so that, when the supports are turned toward the floor panel, the supports are laid above the floor panel maintaining a predetermined space between them, front and rear panels fixed between the roof panel and the floor panel, right and left side panels fixed between each support, and a plurality of foundation jack stands disposed below the floor panel so as to horizontally support the floor panel.

3,992,829

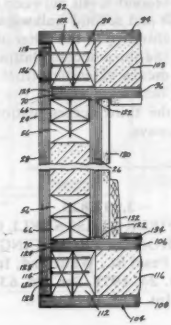
BUILDING STRUCTURE

Willis E. Schellberg; Eugene G. Austad, and Peter F. Jensen, all of Forest City, Iowa, assignors to Winnebago Industries, Inc., Forest City, Iowa

Filed July 14, 1975, Ser. No. 592,616

Int. Cl.² E04H *1/12*

U.S. Cl. 52—79 **13 Claims**



1. A building structure comprising a rectangular box having ceiling and floor walls, and four upstanding walls;

a first rectangular panel in one of said walls,

a second rectangular panel in another of said walls,

each of said panels comprising inner and outer rigid sheet members spaced apart in parallel relationship, said sheet members having interior surfaces facing each other and exterior surfaces, one edge of said outer sheet member extending beyond one edge of said inner sheet member so as to form a protruding flange portion;

at least one frame member in each of said panels operatively secured between said inner and outer sheet members, said frame member having a protruding surface extending beyond said one edge of said inner sheet member along a substantial portion of the length thereof;

said first and second panels being joined together in a perpendicular joint with said frame member protruding surface of said first panel engaging and being operatively secured to said flange portion of said second panel and said frame member protruding surface of said second panel engaging and being operatively secured to said inner sheet member of said first panel.

3,992,830

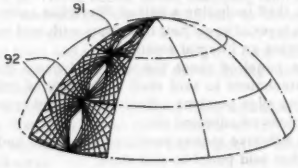
STRUCTURAL PANEL

Samuel H. Shotwell, R.D. No. 3, Pottstown, Pa. 19464

Continuation of Ser. No. 382,936, July 26, 1973, abandoned. This application May 20, 1975, Ser. No. 579,107

Int. Cl.² E04C *2/38*; E04B *7/10*

U.S. Cl. 52—81 **23 Claims**



1. A structural panel comprising a frame and two sets of oppositely-bowed arch members which overlap each other to define a network within the interior of said frame, said arch members being generally co-planar with said frame and having

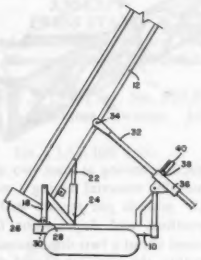
their ends securely fastened to an interior surface of said frame, the middle portion of one arch member in each of said sets being fastened to and being in load supporting engagement with said frame, and the middle portion of each of the interiorly successive arch members in each set is fastened to and is in load supporting engagement with the middle portion of the next adjacent arch member in that set.

3,992,831

ANGLE DRILLING APPARATUS

Ronald Francis Bukovitz, and Ernst Lennart Lindstedt, both of Clarksburg, W. Va., assignors to Ingersoll-Rand Company, Woodcliff Lake, N.J.

Filed Feb. 18, 1976, Ser. No. 658,878
Int. Cl.² E04H *12/34*
U.S. Cl. 52—116 3 Claims



1. Drilling apparatus comprising: a platform; a pair of laterally separated supports extending upwardly from the platform, each having a shaft receiving bore and a slot extending from the shaft receiving bore; a drill tower having shaft means adapted to slide into the slots for pivotally connecting the drill tower to the supports; positively locking means including a pair of diametric locking ears on the shaft means adapted to positively lock the shaft means in said slots when the drill tower is horizontal and adapted to permit the shaft means to slide from the supports after the drill tower is moved to the vertical position; means for pivoting the drill tower about the first pivot means; a second pivot means including slotted means mounted on the platform and a second part of the drill tower adapted to fit into the slotted means; means for positively locking said second part of the drill tower to the platform; and means for pivoting the drill tower about the second pivot means, whereby the drill tower may be pivoted from the horizontal position to the vertical position, positively locked to the second pivot means, disconnected from the first pivot means and pivoted about the second pivot means.

3,992,832

STAIRWAY SAFETY SUSPENSION SUPPORT MEANS

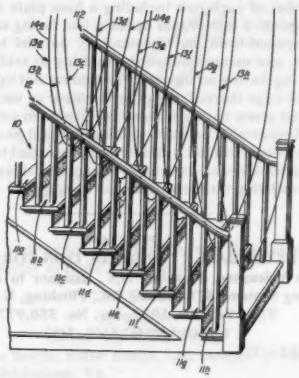
Thomas Norvin Ferwerda, 888 Park Ave., New York, N.Y. 10021

Filed May 13, 1976, Ser. No. 686,227
Int. Cl.² E04F *11/18*
U.S. Cl. 52—184 8 Claims

1. A stairway safety suspension means comprising, in combination;

1. overhead means extending along the stairway above the flight of stairs;

2. a plurality of depending loops of flexible strand means suspended successively from said overhead means with the bottoms of said loops located above the steps less than the heights of people; and



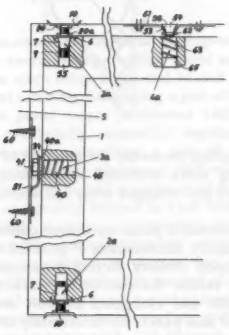
3. means dictating that the planes of said loops are oriented generally longitudinally along the stairway.

3,992,833

APPARATUS FOR MOUNTING A WINDOW OR A DOOR FRAME

Josef Hulinsky, Dieselstrasse 17, A-4400 Steyr, Austria

Filed June 3, 1975, Ser. No. 583,261
Claims priority, application Austria, Apr. 1, 1975, 2470/75; June 5, 1974, 4645/74; July 30, 1974, 66260/74
Int. Cl.² E06B *1/04*; E05D *15/22*
U.S. Cl. 52—206 24 Claims

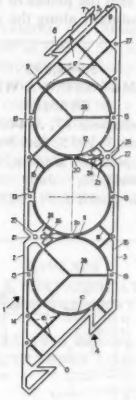


1. An apparatus for fastening a frame in an upright wall opening of a structure, comprising said wall opening having opposite vertical sides;

respective tilting means mounted in said wall opening and pivotally engaging said frame between each of said sides and a respective side of said frame, each of said tilting means including a pair of members defining a pivot axis and relatively rotatable about said axis, one of the members of each pair being insertable into the other member in a direction transverse to the axis, a first member of each pair being mounted on said frame and a second member of each pair being mounted on said structure; and

a plurality of fixing means mounted on at least one other side of said frame and engageable with said structure in said opening for securing said frame in place therein, one member of each pair including a base plate mounted on a respective side of said opening and facing said frame, a lug spaced-from and substantially parallel to said base plate, and means connecting said lug to said base plate, said lug having an upwardly extending slot opening at an upper edge thereof, the other member of said pair being a head screw having a shank receivable in said slot and a head receivable between said lug and said base plate, said frame being formed with internally threaded bores receiving internally-and-externally threaded bushings, said head screws being threaded into said bushings.

3,992,834
EXTRUDABLE CONSTRUCTION FORMS
Marcello Valenzano, Flushing, N.Y., assignor to ABCO FAB Building Systems & Licensing Co., Flushing, N.Y.
Filed Feb. 19, 1975, Ser. No. 550,977
Int. Cl.² E04C *1/39, 2/52*
U.S. Cl. 52—220 **9 Claims**



1. Construction forms for the erection of structural assemblies utilizing three extruded interlocking building panels assembled in a pre-arranged array and wherein the panel array comprises,

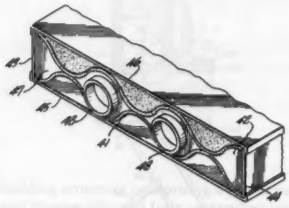
a. a first extruded panel enclosure consisting of a pair of spaced-apart, intermediate V-grooved side walls, including beveled corners thereof structurally supported by conduit means therebetween, bracket means between said walls and elongated conduit means running the length of said panels for structurally stiffening said panel walls and conduit means and 45° beveled end walls terminating said enclosure including attaching means thereon for attachment to abutting panels,

b. a second extruded end panel enclosure configured as a right angle and includes a pair of walls each terminating at one extreme at right angles to each other and the other extremes, one including a beveled corner, terminating in a third wall, said third wall having attaching means thereon for attachment to abutting panels, the said walls each being structurally supported by cross-beam therebetween, and

c. a third extruded intermediate panel enclosure configured as a right angle and includes a pair of walls each terminating at one extreme at right angles to each other and the other extreme, including beveled corners, terminating in a third wall, and wherein each of said walls comprising the pair have thereon attaching means for attachment to abutting panels, the said walls each being structurally supported by cross-beam means therebetween, and

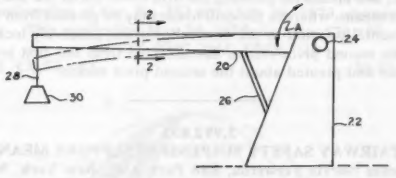
d. wherein each of the respective panels are disposed to, when attached at their extremities, to form the completed pre-arranged assembly, present a continuous structural assembly with no apparent reveals at the abutting extremities of said panels by virtue of the beveled terminations of said panels.

3,992,835
SINUSOIDAL STRUCTURAL ELEMENT
David R. Saveker, 711 Hanford St., Pismo Beach, Calif. 93449
Division of Ser. No. 452,127, March 18, 1974, which is a continuation-in-part of Ser. No. 170,789, Aug. 11, 1971, abandoned. This application Dec. 17, 1975, Ser. No. 641,623
Int. Cl.² F28F *3/00*
U.S. Cl. 52—220 **7 Claims**



1. A shell structure having at least two self-supporting integral sheets of metallic material having a modulus of elasticity greater than 10^6 pounds per square inch characterized by alternating elevations and depressions three-dimensionally sinusoidally variant about a two-dimensional or non-euclidean surface of neutrality, the surfaces of said sheet being curvilinearly continuous in passing from the peaks of said elevations through said plane to the floors of adjoining depressions, said sheets being in a stacked relationship, one to another and in such relationship as to provide a space between said sheets for the passage of fluids; boundary layers affixed to the outer surface of the outermost sheets; ends of said structure being configured for male-female connection of a series of said structures for the passage of fluid therethrough.

3,992,836
CRANE
Pradip Kanti Mitra, 7646 Ardleigh St., Philadelphia, Pa. 19118
Filed Mar. 5, 1975, Ser. No. 555,396
Int. Cl.² E04C *3/10*
U.S. Cl. 52—223 R **5 Claims**



1. An improved boom for a crane, comprising:

a. a hollow tubular member;

b. a longitudinally extending first plate and a longitudinally extending second plate spaced from first plate and structurally connected thereto by structural connecting means for force transmission therebetween;

c. anchor plates spaced from one another extending laterally and transversely of said boom and engaging at least said first plate for force transmission thereto;

d. prestressing means, comprising a plurality of prestressing members engaging said anchor plates and adjusted to exert a force on said anchor plates and said first plate to place said first plate in compression longitudinally and place said second plate in tension longitudinally by force transmission through said structural connecting means;

e. stiffening means comprising a plurality of longitudinally extending plate members connected to said structural connecting means and extending laterally substantially parallel to said first and second plates and being spaced therefrom, to inhibit bending of said boom in the direction of the plane of their lateral extension; and

f. said first and second plates comprising upper and lower portions respectively of said hollow tubular member, said structural connecting means comprising the side portions of said hollow tubular member, and said stiffening means being provided within the enclosure of said hollow tubular member and extending inwardly from said side portions.

3,992,837

PRESS STAND

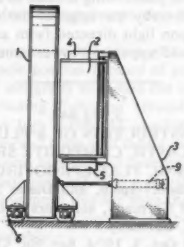
Goran Dahlman, and Sten Nilsson, both of Helsingborg, Sweden, assignors to Allmanna Svenska Elektriska Aktiebolaget, Vasteras, Sweden

Filed July 3, 1975, Ser. No. 593,050

Claims priority, application Sweden, July 29, 1974, 7409757

Int. Cl.² B30B 1/00

U.S. Cl. 52—223 R **3 Claims**



1. Press stand containing two-part yokes, two pillars and a prestressed sheath of strip or wire wound around the yokes and the pillars, said sheath holding the yokes and pillars together and taking up forces acting on the inner surfaces of the yokes, in which the yokes each comprise a bow-shaped outer portion and a separate substantially semi-cylindrical fill-up portion.

3,992,838

INSULATED WALL LOG

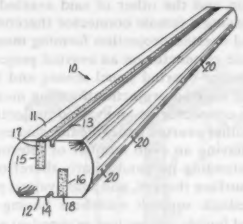
Vito M. Vizziello, Hamden, Conn., assignor to New England Log Homes, Inc., Hamden, Conn.

Filed July 14, 1975, Ser. No. 595,590

Int. Cl.² E04B 1/10

U.S. Cl. 52—233 **7 Claims**

1. A building construction element comprising a solid natural wood log having flat parallel upper and lower surfaces adapted for engagement with surfaces of adjacent construction elements, a longitudinal groove extending inwardly from each said surface, the median planes of the grooves being substantially perpendicular to the planes of said surfaces, said median planes of the grooves being spaced laterally of the log and each groove having a depth equal to approximately half the distance between said surfaces, and each groove being



filled with a body of foamed plastic having thermal insulating qualities superior to those of the wood.

3,992,839

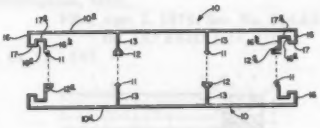
SNAP-ON PANELING

Joseph N. La Borde, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.

Continuation of Ser. No. 525,960, Nov. 21, 1974, abandoned, which is a continuation of Ser. No. 366,585, June 4, 1973, abandoned. This application June 19, 1975, Ser. No. 588,326

Int. Cl.² E04L 2/32

U.S. Cl. 52—275 **9 Claims**



1. A wall means comprising an inverted snap-together panel assembly and an everted snap-together panel assembly slidably connected to each other in an end to end relationship, said inverted panel assembly comprising a pair of substantially identical inverted panel means positioned 180° relative to each other and paralleledly connected together, and said everted panel assembly comprising a pair of substantially identical everted panel means positioned 180° relative to each other and paralleledly connected together; said inverted panel assembly having an opening formed in each end thereof for slidably and lockedly receiving a projecting means on said everted panel assembly; said everted panel assembly having a projection means on each end thereof for slidably and lockedly mating with said openings in the end of said inverted panel assembly; said inverted panel means comprising a member having a generally flat exterior surface and an inverted opening forming means on each end thereof, one of said inverted opening forming means having a male connector thereon and the other of said inverted opening forming means having a female connector thereon, said male connector on said inverted opening means adapted to receive a female connector on an inverted opening forming means of another inverted panel means and said female connector on said inverted opening means adapted to be received by a male connector on an inverted opening means of said another panel means, said inverted panel means member having an even number of intermediate support members extending perpendicularly therefrom opposite the flat exterior surface thereof, and said inverted panel means member intermediate support members having alternately thereon, male and female connectors snapped-to and lockedly mated with female and male connectors, respectively, on support members on another inverted panel means member; and, said everted panel means

comprising a member having a generally flat exterior surface and an everted projection forming means on each end thereof, one of said everted projection forming means having a male connector thereon and the other of said everted projection forming means having a female connector thereon, said male connector on said everted projection forming means adapted to receive a female connector on an everted projection forming means of another everted panel means and said female connector on said everted projection forming means adapted to receive a male connector on an everted projection forming means of said another everted panel means, said everted panel means member having an even number of intermediate support members extending perpendicularly therefrom opposite the flat exterior surface thereof, and said everted panel means member intermediate support members having alternately thereon, male and female connectors snapped-to and lockedly mated with female and male connectors, respectively, on support members on another everted panel means member.

3,992,840
FRAMELESS HOUSING

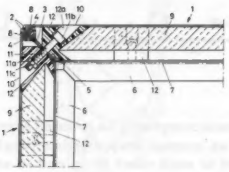
Alois Badat, Dietikon, and Peter Hruby, Zurich, both of Switzerland, assignors to Orion Werke AG, Zurich, Switzerland

Filed Apr. 7, 1975, Ser. No. 565,446

Claims priority, application Switzerland, Apr. 10, 1974, 5056/74

Int. Cl.² E04B *1/38*

U.S. Cl. 52—285 **8 Claims**



1. A frameless housing comprising a plurality of wall-forming plates, each of said plates having side edges and multiple flexed edges, each plate being rearwardly flexed along each of its side edges towards the inside of the housing to form said multiple flexed edges, each multiple flexed edge being mitered at its corners, each multiple flexed edge adjoining an associated side edge of its respective plate, each multiple flexed edge having a flexed portion forming a channel-shaped section and a connection section merging into said channel-shaped section, said connection section extending at an angle of about 45° towards the inside of the plate, means for connecting two plates which abut one another at right-angles at the region of their abutting connection sections, and a seal clampingly held between the channel-shaped sections of said two right-angular abutting plates, the channel-shaped sections of said two right-angular abutting plates mutually confronting one another, each channel-shaped section comprising a first strip of the multiple flexed edge bent through 180° and bearing against the inside surface of the plate and a second strip of the multiple flexed edge extending at right-angles to said first strip, said strips delimiting a longitudinal channel defined by said channel-shaped section for receiving said seal, said longitudinal channel having a substantially triangular cross-section.

3,992,841
PANEL CONSTRUCTION AND PROJECTION SCREEN CONSTRUCTED FROM SUCH PANELS

Robertson Ward, Jr., 21 W. Elm St., Chicago, Ill. 60610

Filed Aug. 30, 1974, Ser. No. 502,157

Int. Cl.² E04C *1/24*; E04B *1/342*

U.S. Cl. 52—309 **11 Claims**

1. A construction for a projection screen employing lap joints between adjacent, prefinished, upper and lower, non-intersecting panels each having a continuous one-piece reflective vinyl finish suitable for projection of light over the entirety thereof, the upper panel at each top joint being initially of generally uniform thickness and of such size as to provide a portion that will overlap at least one adjacent lower panel, the overlap portion of the upper panel lying in the plane defined by said thickness of the panel, the overlap portion of the upper panel rearwardly of said continuous reflective finish having a taper along at least the one edge intended to overlap an adjacent panel, whereby the thickness of said upper panel at the very edge is substantially reduced and tapers from said uniform thickness to the edge in a relatively short distance, and the tapered edge being deformed so that it will conform to and substantially lay against the lower panel it is intended to overlap without destroying the continuous character of the reflective finish, with the deformed tapered edge of the upper panel and the lower panel being located in adjacent non-intersecting planes, whereby the edge of the upper panel has a minimal effect upon light directed from any angle upon the screen in which said upper and lower panels are employed.

3,992,842
ROOF CONSTRUCTION OF A PLURALITY OF THERMOPLASTIC COMPOSITE SHEETS WITH INORGANIC FLAMEPROOFING LAYER

Karl Haage, Troisdorf-Spich, and Dieter Scharff, Troisdorf-Sieglar, both of Germany, assignors to Dynamit Nobel Aktiengesellschaft, Germany

Filed Oct. 3, 1974, Ser. No. 511,675

Claims priority, application Germany, Oct. 3, 1973, 2349666

Int. Cl.² E04C *1/00*; B32B *3/02*

U.S. Cl. 52—309 **17 Claims**

1. A thermoplastic synthetic resin composite sheet for sealing non-graveled, single-shell roofs or the like, with an inorganic flameproofing layer, which comprises two layers of thermoplastic synthetic resin having a separate inorganic flameproofing layer embedded therebetween, said layers of thermoplastic synthetic resin having lateral edges that are joined together to envelop the flameproofing layer.

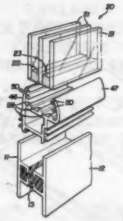
10. A roof construction comprising a plurality of the composite sheets of claim 1, positioned on a layer of thermal insulating material within a single-shell roof, the lateral edges of said plurality of sheets being joined together to form a seal over said thermal insulating material.

3,992,843

GLAZING ADAPTOR

Joseph DiFazio, Troy, Mich., assignor to Acorn Building Components, Inc., Detroit, Mich.

Filed Aug. 25, 1975, Ser. No. 607,142
Int. Cl.² E04B 1/62
U.S. Cl. 52—398 4 Claims



1. A glazing adaptor for modifying the effective width of a frame opening from a first thickness to a second thickness with the difference between said first and second thickness exceeding the thickness of a pane of glass, comprising:

a generally flat thin rigid base of insulating material;

a frame-engaging portion formed integrally with said base, said frame-engaging portion being formed of relatively rigid insulating material and having first and second spaced apart parallel legs extending downwardly from one side of said base;

each of said legs of said frame-engaging portion having an outwardly extending shoulder to limit the extent of insertion of said frame-engaging portion into a frame opening; and

a receptacle portion to receive a glass panel subassembly, said receptacle portion formed of an insulating material and formed integrally with said flat base, said receptacle portion including first and second substantially rigid spaced apart legs extending upwardly from the side of said base opposed from said frame-engaging portion, said first and second legs of said receptacle portion tapering slightly toward each other in a direction away from said base and being more flexible than the legs of said frame-engaging portion to accommodate the insertion of a glass panel subassembly;

whereby upon insertion of the frame-engaging portion into a frame opening, the receptacle portion provides an effective glass panel opening of substantially different thickness from the frame opening.

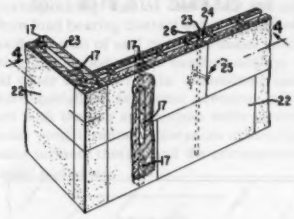
3,992,844

BUILDING PANEL

Joseph Clemens Gretter, 119 Seir Hill Road, Wilton, Conn. 06897

Filed Aug. 28, 1975, Ser. No. 608,658
Int. Cl.² E04B 2/00, 1/02
U.S. Cl. 52—426 5 Claims

1. A wall structure comprising a plurality of rectangular substantially flat blocks positioned in a plurality of horizontal rows in edge-to-edge relationship to form an outer wall, a second plurality of rectangular substantially flat blocks positioned in a plurality of horizontal rows in edge-to-edge relationship to form an inner wall spaced from said outer wall, the inner faces of said blocks each having a plurality of vertically extending grooves therein such that the grooves of the several rows of blocks are aligned, an elongated spacer member vertically positioned in one pair of opposed rows in each block of said inner and outer walls and extending from top to bottom thereof, and elongated spacer members of varying lengths are positioned in abutting relationship in another pair of opposed rows in each block whereby the uppermost of said last mentioned spacer members extend upwardly into alternate grooves in a block of a row thereabove, and means interposed between said spacer members and straddling and embedded in



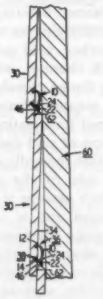
vertically abutting blocks of each row for clamping horizontal edges of opposed blocks in said inner and outer walls to align the panels in position.

3,992,845

WALL SIDING FASTENERS AND ASSEMBLIES

Louis E. Grzesiek, Dana Point, Calif., and William H. Juntunen, Detroit, Mich., assignors to Abitibi Corporation, Birmingham, Mich.

Filed Apr. 2, 1975, Ser. No. 564,654
Int. Cl.² E04D 1/34, 1/12
U.S. Cl. 52—547 10 Claims



1. A siding clip of resilient material including a pair of opposed end portions and an intermediate portion which together define a generally C-shaped configuration when said clip is seen in side elevation, one of said opposed end portions including a leg portion extending inwardly and forwardly therefrom at an acute angle with respect to said intermediate portion for extending into and engaging in an angularly disposed recess in a panel and the other end portion including an inturned lip directed generally toward said leg portion and having a generally sharp free edge adapted to resiliently grip a wall of a further recess of a panel, the clip further including a support leg adapted to engage an upper edge of a further panel, said support leg disposed such that at least a portion of same lies generally in a plane displaced rearwardly of an imaginary plane passing through said opposed end portions.

3,992,846

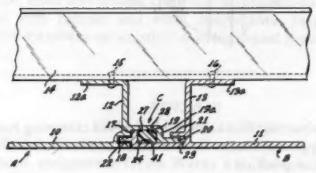
COMPOUND FILLED KEY INTERLOCK JOINT

Keith W. Tantlinger, Coronado, Calif., assignor to Rohr Industries, Inc., Chula Vista, Calif.

Continuation of Ser. No. 453,378, March 21, 1974. This application July 10, 1975, Ser. No. 594,828

Int. Cl.² E04C 1/30; F16B 11/00

U.S. Cl. 52—588 15 Claims



1. A compound filled, key interlock joint joining in edge-to-edge, interlocked relation two relatively thin, solid, extruded aluminum plate members, said joint comprising:

an inwardly extending flange integral with and extending along the joined edge portion of one of said plate members;

means integral with, and defining an outwardly open channel along,, the joined edge of the other of said plate members, said channel defining means being located inwardly of, and underlying an inner surface portion of, said one plate member, said inwardly extending flange extending into such channel, with the free edge of the inwardly extending flange closely adjacent the bottom of such channel, the means defining the laterally outward side of such channel terminating closely adjacent such inner surface portion of said one plate member, thereby defining, between said inwardly extending flange and the laterally outward side of the channel, a substantially closed passage, which passage is located inwardly of such inner surface portion and is expanded laterally upon movement of the plate members edgewise toward each other to move the inwardly extending flange toward the laterally inward side of the channel, and which passage is contracted by a reverse, separative movement of the two plate members,

a first shear resisting locking flange on the laterally outwardly directed side of said inwardly extending flange, said first projection being seated in fitted relation in a correspondingly shaped recess provided therefor in the laterally inward side of such channel when the plate members are moved laterally toward each other to expand such passage laterally to its maximum size,

a second shear resisting locking flange on the laterally outward side of such channel, said second projection being seated in fitted relation in a correspondingly shaped recess provided therefor in said one plate member when the plate members are moved laterally toward each other to expand such passage laterally to its maximum size, and

a quantity of flowable, hardenable, key forming compound injected under selected pressure into such passage, when the latter is so expanded, to fill at least a selected portion thereof, and hardened, thereby to prevent lateral contraction of such passage and to retain the first and second locking projection in their respective recesses.

3,992,847

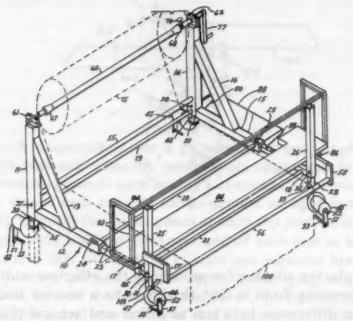
METHOD AND APPARATUS FOR INSTALLING INSULATION

Wesley Gene Heath, Houston, Tex., assignor to B & C Construction Company, Inc., Houston, Tex.

Filed Mar. 1, 1976, Ser. No. 662,614

Int. Cl.² E04G 21/14; E04B 1/62

U.S. Cl. 52—743 10 Claims



10. Method for installing insulation in vertical walls of buildings, comprising providing a carrier rollable along tracks at the top of the wall supporting a roll of insulation in elongate strip form, unrolling a strip of insulation from the roll and guiding said strip downwardly in the line of the wall, fixing the lower end of said strip at the bottom of the wall, rewinding said strip at the roll to tighten said downwardly extending strip and remove wrinkles therefrom supporting said strip at the top of the wall, fixing the upper end of the strip to the top of the wall, cutting off the top of said strip from the insulation leading from the roll, rolling the carrier to the position of installation of another strip of insulation, and repeating the steps set forth.

3,992,848

BUILDINGS

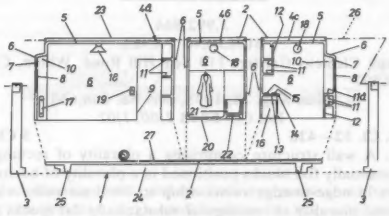
Fritz Christoph Stucky, Zug, Switzerland, assignor to Credelca A.G., Zug, Switzerland

Filed May 24, 1974, Ser. No. 473,191

Claims priority, application United Kingdom, May 25, 1973, 25091/73

Int. Cl.² E04G 21/04

U.S. Cl. 52—745 8 Claims



1. A method of constructing a transportable prefabricated room element comprising:

a. preparing a load-bearing floor panel structure providing a horizontal floor surface;

b. preparing at least one load-bearing vertical structure;

c. preparing at least one prefabricated self-supporting cell unit comprising a ceiling member and at least one full height wall member depending from the ceiling member, and

d. assembling the prefabricated self-supporting cell unit and the load-bearing vertical structure to the floor panel structure by joining the depending wall member to the horizontal floor surface and joining the load-bearing vertical structure to the floor panel structure and to the cell unit at a factory remote from a building site.

3,992,849

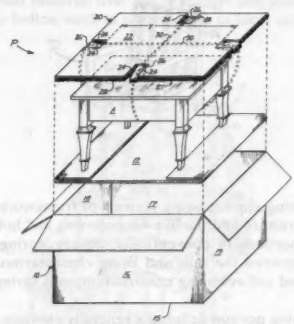
METHOD OF INNER PACKAGING OF ARTICLES OF FURNITURE

Robert B. Lett, III, 1102 Greenway Drive, High Point, N.C. 27262

Division of Ser. No. 412,616, Nov. 5, 1973, abandoned. This application Oct. 29, 1975, Ser. No. 626,840

Int. Cl.² B65B *25/00, 27/00*

U.S. Cl. 53—27 **2 Claims**



1. A method for inner packaging articles of furniture, such as tables, chairs and the like, of varying shapes and sizes, in an outer container having a standard size relative thereto, said outer container being of the type having top, bottom, front, rear and side walls, said inner packaging method comprising the steps of:

a. providing a substantially rigid interlay sheet having length and width dimensions greater than the horizontal dimensions of said article of furniture to establish minimum predetermined clearance between the sides of said article of furniture and the corresponding side walls of said outer container, a thickness dimension to establish minimum predetermined clearance between the upper surface of said article of furniture and the corresponding wall of said outer container, which length and width dimensions substantially coincide with the horizontal, inner cross sectional dimensions of said outer container to provide a snug fit therebetween, and positioning said substantially rigid interlay sheet in load bearing contact with the upper surface of said article of furniture;

b. aligning said interlay sheet atop said article of furniture and substantially coaxially therewith, with the edges of said interlay sheet extending beyond the sides of said article of furniture;

c. providing a plurality of inwardly extending parallel slits in the periphery of said interlay sheet, forming pairs of opposed, bendable tabs therearound, said opposed tabs having a dimension therebetween substantially equal to or smaller than the corresponding dimension of said article of furniture, and encircling said article of furniture and said interlay sheet with a first adjustable band overlaying a pair of said opposed tabs and a second adjustable band overlaying another pair of said opposed tabs, which second band is positioned normal to said first band;

d. tightening said adjustable bands and depressing said pairs of opposed, bendable tabs into conforming relationship with the dimensions of said upper surfaces of said article of furniture to securely position said interlay sheet in load bearing contact with the upper surface of said article of furniture and spatially therewith to form a banded package component;

e. providing said outer container with a pallet therein having a thickness to establish minimum predetermined clearance between the bottom of said article of furniture and the corresponding wall of said outer container and to maintain load bearing contact between said interlay sheet and said top wall of said outer container; and

f. inserting and enclosing said banded package component in said outer container while maintaining said article of furniture spatially in said outer container in load bearing contact with the top and bottom walls thereof and with minimum predetermined clearances maintained between the outer surfaces thereof and the corresponding walls of said outer container.

3,992,850

APPARATUS FOR PACKING MATERIALS IN SYNTHETIC FOILS

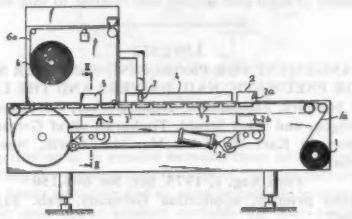
Arthur Vetter, Groenenbach, Germany, assignor to Multivac Sepp Haggenmueller KG, Germany

Division of Ser. No. 467,861, May 8, 1974. This application Feb. 27, 1976, Ser. No. 661,962

Claims priority, application Germany, May 9, 1973, 2323409

Int. Cl.² B65B *31/02*

U.S. Cl. 53—112 R **4 Claims**



1. In an apparatus for packing materials which tend to splash when boiling, said apparatus being of the type including means for packing material in packing foils of synthetic material, means for sealing the packed material in the foils in an air-tight manner by heat sealing the synthetic material surrounding the packing material, and means for evacuating the space above the packed material; the improvement comprising means for measuring the temperature of said packed material prior to the evacuation of space above the packed material, and means coupled to said temperature measuring means for adjusting the vacuum employed in evacuating said space in accordance with a steam pressure curve corresponding to said filled material as a function of the temperature measured by said temperature measuring means for maintaining the vacuum just below the vacuum at which said packed material boils.

3,992,851

PACKAGING APPARATUS

Robert C. James, and Edward Garczynski, both of Sheboygan, Wis., assignors to Hayssen Manufacturing Co., Sheboygan, Wis.

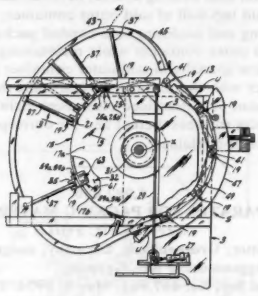
Filed Sept. 10, 1975, Ser. No. 611,895

Int. Cl.² B65B *51/26, 9/06*

U.S. Cl. 53—182 R **14 Claims**

1. Apparatus for packaging units in flexible sheet material wherein the units are spaced logitudinally in a tube of said material and the apparatus has means for sealing the tube between the units, said sealing means comprising a wheel rotatable on an axis and a series of sealing units carried by the

wheel, each sealing unit having means for coupling it to the wheel for travel therewith and adapted for uncoupling of the sealing unit from the wheel to allow the wheel to rotate while the sealing unit remains stationary, said wheel having a pair of spaced side members engageable by said coupling means for coupling said sealing units to the wheel and for movement of



the sealing units with the wheel and a guide member between the side members rotatable with the wheel, each said sealing unit further having means engageable with said guide member for substantially limiting angular movement of each said sealing unit with respect to the plane of the wheel and for resisting movement of each said sealing unit relative to said wheel.

3,992,852

ARRANGEMENT FOR PRODUCING FASTENER STRIPS FOR PNEUMATIC NAIL DRIVERS AND THE LIKE

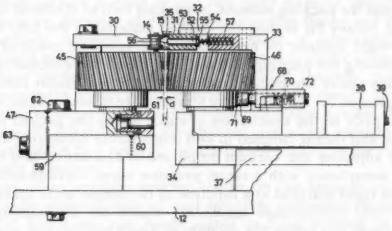
Heinz Schwarz, Zizishausen; Heinz Decker, Nurtingen-Oberensingen, and Hans Strobl, Tischardt, all of Germany, assignors to Karl M. Reich Maschinenfabrik, Nuertingen, Germany

Filed Aug. 1, 1975, Ser. No. 601,150

Claims priority, application Germany, Feb. 21, 1975, 2507467

Int. Cl.² B65B *13/04*

U.S. Cl. 53—196 **11 Claims**



1. In an arrangement for producing nail strips which includes conveying means having a succession of spaced grooves for receiving and advancing, in a first plane, a succession of incoming nails in spaced relation, an elongated support member having a first bearing surface extending over a first member of successive grooves of the conveying means for capturing the nails received in said number of grooves, means for contacting the shafts of the successive captured nails with at least one plastic ribbon, and means disposed downstream of the contacting means for molding the adhered ribbon about the captured nails to form a nail strip, the improvement which comprises, in combination, a pressure member having a second bearing surface extending over a second number of grooves of the conveying means and disposed adjacent the molding means and downstream of the contacting means, the second number of grooves being less than the first number of grooves, and means for resiliently supporting the pressure member with the second bearing surface in inwardly overlapping relation with respect to the first bearing surface of the support member for contacting the shafts of the adhered nails captured in the second number of grooves.

3,992,853

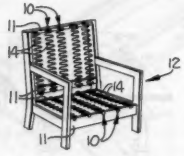
SPRING CLIP

Max O. Morris, 582 E. Sunset Highway, Issaquah, Wash. 98027

Filed June 9, 1975, Ser. No. 585,451

Int. Cl.² F16B *7/04*

U.S. Cl. 52—760 **10 Claims**



1. A spring clip for being secured to framework rails of an item of furniture and the like for receiving and holding opposite end portions of conventional, zig-zag, spring strips suspended between the rails and being characterized by a self-locking and self-releasing construction; said spring clip comprising:

a fastening portion defining a generally elongate surface for resting against and being secured to the rail; and

a spring receiving portion secured to said fastening portion and comprising flexible, resilient material and a generally C-shaped, cross-sectional configuration defining an interior opening therein and a passageway therethrough for insertion and removal of the end portion of the spring strip therethrough and into said interior opening, said passageway being of a normally less cross-sectional dimension than the cross-sectional dimension of the end portion of the spring strip for flexible expansion of said spring receiving portion enlarging said passageway during insertion and removal of the end portion of the spring strip therethrough and for resilient contraction of said spring receiving portion returning said passageway to its normal cross-sectional dimension after receipt of the end portion of the spring strip in said interior opening for locking of the end portion of the spring strip therein.

3,992,854

METHOD AND APPARATUS FOR MAKING DUAL COMPARTMENT PACKAGE

Duane Aaron Howell, Davenport, Iowa, and David G. Walton, Washington, Ill., assignors to The Kartridg Pak Co., Davenport, Iowa

Filed Feb. 18, 1976, Ser. No. 659,102

Int. Cl.² B65B *9/12*, *51/05*, *61/02*

U.S. Cl. 53—14 **16 Claims**

1. In an apparatus for continuously forming a series of packages of the type including a multiple compartment tube made from a single web of pliable film which is formed into said tube, filled with differing substances in each compartment, gathered at two positions along its length, sealed at each gathered portion by pairs of closure clips clinched thereabout, and severed between the closure clips in each pair thereof; said apparatus comprising:

means for folding a portion of said web adjacent one side edge thereof over upon the remainder of said web forming a two-ply margin:

means for forming said web into a continuous tube with the opposing side edge of said web being on the outside thereof and overlapping said two-ply margin until said one side edge and said opposing side edge are in engaging registration;

means for sealing together said two-ply margin and said opposing side edge with a single composite seal to form two separate compartments in said tube;

means for filling each compartment in said continuously formed tube with a differing substance, and

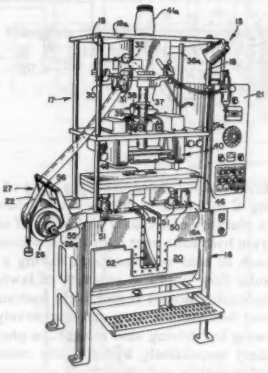
means for gathering portions of said tube and clinching pairs of closure clips around said gathered portion.

16. A method for continuously forming a series of dual compartment tubular packages made from a single web of pliable firm material, said method comprising the steps of:

drawing said film material from a web thereof;

folding a marginal strip of said material under the remainder thereof to form a two-ply margin;

feeding said material over the shoulders and into the interior of a hollow neck in a film folder to form said web into



a continuous tube with an opposing edge of said web overlapping said two-ply margin, said continuous tube being formed around a large tubular mandrel which extends through said hollow neck;

moving said opposing edge and said marginal strip outwardly of the remainder of said tube to provide for positioning a small tubular mandrel inside said two-ply margin;

returning said opposing side edge and said marginal strip inwardly to their previous position;

sealingly engaging together said opposing side edge and said two-ply margin with a single composite seal to form two sealed compartments in said continuous tube;

filling said compartments with substances flowing from said tubular mandrels positioned therein;

gathering said filled tube sequentially along its length;

sealing each gathered portion by clinching pairs of closure clips therearound; and

severing said material between closure clips in each pair thereof.

3,992,855

AUTOMATIC WRAPPING MACHINES

Angelo Palmieri, and Sandro Salicini, both of Bologna, Italy, assignors to Carle & Montanari S.p.A., Italy

Filed Dec. 31, 1975, Ser. No. 645,592

Claims priority, application Italy, Jan. 3, 1975, 12403/75

Int. Cl.² B65B *11/36*

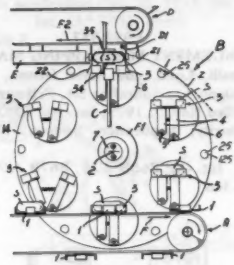
U.S. Cl. 53—209 **6 Claims**

1. Apparatus for transferring pieces to be wrapped from a lower feed conveyor to an upper wrapping conveyor, comprising:

a. a lower horizontal rectilinear feed conveyor carrying a plurality of equidistantly spaced containers presenting an open top and a plan section such as to leave free substantial portions of the peripheral zones of the piece to be wrapped;

b. an intermediate rotatable turntable conveyor having its axis of rotation horizontal and orthogonal with respect to the said lower feed conveyor which latter comes to be positioned as a horizontal chord with respect to a lower arc section of said turntable conveyor;

c. a plurality of composite cradles mounted on said turntable conveyor and equidistantly spaced around a pitch circle common thereto so as to describe a circular path upon rotation of the turntable, each composite cradle consisting of at least two opposed sections presenting upper support surfaces for the free peripheral zones of the piece to be wrapped, said cradle sections being arranged to be spaced apart or opened so as to permit the passage therethrough of a container of the lower conveyor carrying a piece to be wrapped, and to be closed



together so as to present between them an opening permitting the passage therethrough of the said container of the lower conveyor and so as to be capable to engage by their said upper support surfaces the free peripheral zones of the piece to be wrapped;

d. means for controlling the said opening and closure of the said composite cradle sections so that upon rotation of the turntable conveyor the cradle sections are opened during the descent movement towards the lower feed conveyor, are closed after having passed the point of intersection of their descent path with the rectilinear path of the said lower conveyor, in such a manner that they are traversed in their said open position by a container of said lower conveyor carrying a piece, and are lifted in their closed position, while carrying the piece taken from the container, at least until they reach substantially the upper point of their circular path; and

e. gripper means, arranged substantially in correspondence with the upper point of the circular path of the composite cradles, arranged to grip the piece carried by each cradle so as to lift it out of said cradle and insert it into an upper wrapping conveyor.

3,992,856

STIRRUP PAD

A. James McGovern, Los Gatos, Calif., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

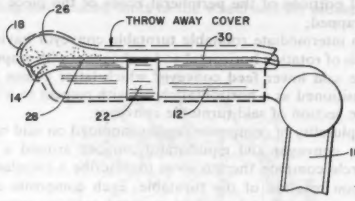
Filed Aug. 7, 1975, Ser. No. 602,819

Int. Cl.² B68B *1/00*

U.S. Cl. 54—1 **5 Claims**

1. A cover pad for the stirrup of a patient examination table, comprising a sleeve open at one end and defining a mouth for receiving said stirrup therein, at least the distal closed end of said sleeve being out of planar alignment with the remaining surface of said sleeve, a pair of straps disposed on said sleeve

and adapted to contact one another whereby said sleeve may be tightened about said stirrup and fastening means disposed on said straps for securely engaging the same and a first layer of velcro disposed on one surface thereof, a planar removable



cover layer substantially the same size as said sleeve and also including a second velcro layer thereon adapted to engage said first velcro layer whereby said sleeve remains on said stirrup and said cover layer is removed after patient examination.

3,992,857

ARRANGEMENT FOR CAPPING MACHINES

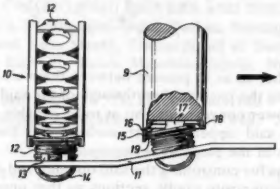
Peter Giacomelli, Lund, and Alvar Olsson, Dalby, both of Sweden, assignors to Sobrefina SA, Fribourg, Switzerland

Filed Nov. 7, 1975, Ser. No. 630,016

Claims priority, application Sweden, Nov. 18, 1974, 7414433

Int. Cl.² B65B *7/28*; B67B *1/00*

U.S. Cl. 53—306 **5 Claims**



1. In a machine for applying closure elements to containers having pouring openings at the top thereof in which at least the closure elements are composed of a resilient material, said machine having means for moving a plurality of upstanding, spaced containers along a horizontal path past a capping station, means including a plurality of vertically movable ram devices each disposed vertically above a container and moving synchronously therewith past the capping station, and a cam track for lowering each ram device as it passes the capping station, the improvement comprising means for dispensing single closure elements, an elongated track-like means having an upwardly inclined portion intermediate its ends for receiving and supporting each consecutive closure element as dispensed onto the lower end portion thereof, said track-like means being disposed above the horizontal path of the containers, means associated with the lower end of each ram device for moving the single closure element dispensed onto the lower end of the track-like means along said track-like means and up the inclined portion thereof so that said closure element approaches the lower end of the associated ram device at an angle thereto, one of the lower end of each ram device and the upper end of each closure element being provided with a recess means and the other being provided with a lip means for cooperating with the recess means whereby when the closure element and ram device reach the upper end of the track-like means the lip means and the recess means are engaged so that the closure element is transported by said ram device, said ram device subsequently forcing said closure element into the opening in said container as it is lowered by said cam track as it passes the capping station.

3,992,858

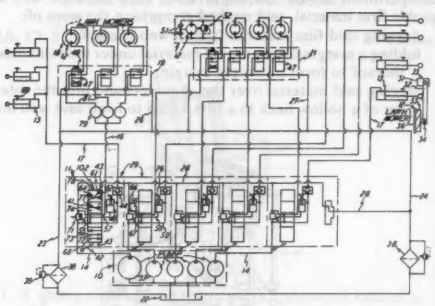
HYDRAULIC SYSTEM FOR CONTROLLING A GANG OF LAWN MOWERS

Glenn Richard Hubbard; Harold John Jacoby; Frank Allen Ecker, all of Racine; Donald Gene Haffner, and Anthony Joseph Salia, both of Milwaukee, all of Wis., assignors to Jacobsen Manufacturing Company, Racine, Wis.

Filed Dec. 1, 1975, Ser. No. 636,697

Int. Cl.² A01D *35/24*

U.S. Cl. 56—7 **16 Claims**



1. A hydraulic system for controlling a gang of lawn mowers, comprising a hydraulic pump, a single-bodid hydraulic valve having a plurality of sections with each of said sections having a separate hydraulic inlet hydraulically connected with said pump, each of said valve sections having a first and a second hydraulic flow outlet, a plurality of lawn mowers, a plurality of hydraulic motors respectively hydraulically connected with said first valve outlets and operatively associated with said mowers for driving said mowers, a plurality of hydraulic cylinders respectively hydraulically connected with said second valve outlets and operatively associated with said mowers for raising and lowering said mowers, a valve spool shiftably disposed in each of said sections and with each of said spools having two hydraulic flow passageways respectively alignable with the first and second said valve outlets for passing hydraulic fluid to said valve outlets, and a handle operatively connected with each of said spools for selective shifting of said spools and consequent passing of hydraulic fluid to either of the two said valve outlets, for either powering said mowers or raising and lowering said mowers.

3,992,859

POWER RAKE

Robert M. Rubin, Lincoln, Nebr., assignor to Outboard Marine Corporation, Waukegan, Ill.

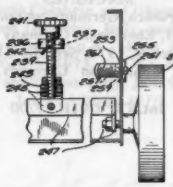
Division of Ser. No. 586,297, June 12, 1975, which is a division of Ser. No. 505,559, Sept. 13, 1974, Pat. No. 3,921,373. This application Oct. 1, 1975, Ser. No. 618,472

Int. Cl.² A01D *50/02*

U.S. Cl. 56—17.2 **3 Claims**

1. A power rake comprising a housing having a top wall and side walls depending from said top wall, front wheel support and guide means comprising means on said housing defining a threaded, vertically extending aperture located closer to one of said side walls than to the other of said side walls, a shaft threaded through said aperture and including, at the upper end thereof, a manually grippable head, a hanger connected to the lower end of said shaft for relative rotary movement therebetween about the axis of said shaft and for common vertical movement with said shaft in response to shaft rotation, means for releasably preventing rotation of said shaft, axle means connected to said hanger for swinging movement in a vertical plane about a fore and aft axis and extending to

said side walls, means on said side walls and on said axle means for guiding vertical movement of said axle means, and



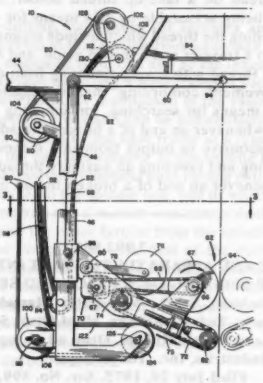
spaced wheels mounted on said axle means on each side of said hanger.

3,992,860

TOWED TOBACCO HARVESTER

Louis W. Bobbitt, Jr., Bobbitt's Farm Supply, Castalia, N.C. 27816

Filed Feb. 10, 1975, Ser. No. 548,740
Int. Cl.² A01D *45/16*
U.S. Cl. 56—27.5 **10 Claims**



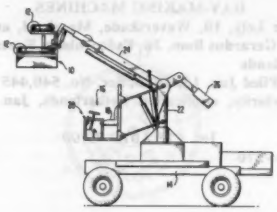
1. A harvester for traveling through the rows of tobacco in a tobacco field, for stripping tobacco leaves from their stalks, and for transporting the stripped leaves to a stowage site, the harvester comprising: a main frame having first and second substantially vertical sides spaced apart a distance to accommodate a row of tobacco stalks therebetween, a front region and a rear region, said main frame adapted to be aligned with its first and second sides substantially parallel to the rows of tobacco in said field; defoliator means centrally mounted on said main frame between said first and second sides for stripping tobacco leaves from their stalks; first conveyor means positioned substantially beneath said defoliator means for receiving the tobacco leaves stripped from the stalks and for conveying the same from the region of said defoliator means toward discharge sites at said first and second sides; second substantially vertical conveyor means associating with said first and second sides, for receiving the tobacco leaves from said first conveyor means at said discharge sites, and for conveying the tobacco leaves in a substantially vertical direction along said first and second sides to further discharge sites; and third conveyor means for receiving the tobacco leaves from said second conveyor means, at said further discharge sites, and for transporting the same to said stowage site; wherein said second conveyor means comprises at least one continuous chain conveyor extending from the front to the rear regions of said main frame; motive means for moving one substantially planar surface of said chain conveyor in a vertically upward direction; a plurality of continuous narrow belts extending from the front to the rear regions of said main frame, and cooperating with said chain conveyor; motive means for moving one surface defined by said plurality of narrow belts in the same vertically upward direction as said one surface of said chain conveyor; and means for urging said one surface of said chain conveyor and said one surface of said plurality of narrow belts toward one another; and wherein said second conveyor means transports tobacco leaves between the cooperating surfaces of said chain conveyor and said plurality of narrow belts.

3,992,861

CROP HARVESTING APPARATUS

John W. Edwards, Wauchula, Fla., assignor to Ginny Bee Harvester Corporation, Tampa, Fla.

Continuation-in-part of Ser. No. 386,421, Aug. 7, 1973, abandoned, which is a continuation-in-part of Ser. No. 362,453, May 21, 1973, abandoned, which is a continuation-in-part of Ser. No. 350,168, April 11, 1973, abandoned, which is a continuation-in-part of Ser. No. 339,914, March 9, 1973, abandoned. This application Oct. 26, 1973, Ser. No. 410,262
Int. Cl.² A01D *46/00*
U.S. Cl. 56—328 R **67 Claims**



1. A crop harvesting apparatus comprising an elongated rotatable drive shaft; a plurality of support members mounted on the rotatable drive shaft; a plurality of crop severing means mounted on the support members to join each pair of adjacent support members; a support station; mounting means for rotatably mounting the rotatable drive shaft on the support station; drive means coupled to the rotatable drive shaft for rotatably driving the rotatable drive shaft; a self-propelled vehicle; an extendible boom having a first end rotatably mounted on the self-propelled vehicle and a second end connected to the support station; control means mounted on the self-propelled vehicle for controlling the movement of the crop harvesting apparatus; level sensing means connected to the support station for sensing in each of two mutually perpendicular vertical planes the orientation with respect to horizontal of the support station; and level adjusting means responsive to the level sensing means for adjusting in said vertical planes the orientation with respect to horizontal of the support station.

3,992,862

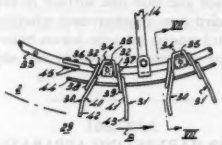
HAYMAKING MACHINES

Cornelis van der Lely, Bruschenrain 7, Zug, Switzerland, and Ary van der Lely, 10, Weverskade, Maasland, Netherlands

Filed Oct. 11, 1974, Ser. No. 514,310
Claims priority, application Netherlands, Feb. 18, 1974, 7402172; Apr. 22, 1974, 7405406
Int. Cl.² A01D *79/02*
U.S. Cl. 56—370 **44 Claims**

10. A hay-making machine comprising a frame at least one rake member supported on said frame, said rake member being rotatable about an upwardly extending axis and having an outer circular supporting member with a plurality of elon-

gated crop working elements located around the circumference of said supporting member, said elements being mounted in groups positioned adjacent one another and the elements of each group being resiliently interconnected to pivot with respect to one another through at least one torsional rod



having at least one rectilinear portion that figuratively crosses said axis ear portion that figuratively crosses said axis said element extending downwardly towards the ground from said circumference and having ends that are deflectable simultaneously in radial and axial directions, said ends being movable to protected positions behind said supporting member.

3,992,863

HAY-MAKING MACHINES

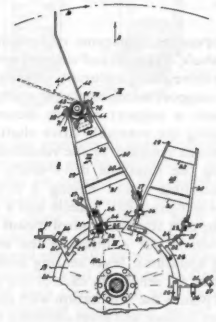
Ary van der Lely, 10, Weverskade, Maasland, and Cornelis Johannes Gerardus Bom, 36, Esdoornlaan, Rozenburg, both of Netherlands

Filed Jan. 13, 1975, Ser. No. 540,445

Claims priority, application Netherlands, Jan. 18, 1974, 7400684

Int. Cl.² A01D *79/00*

U.S. Cl. 56—370 **28 Claims**



1. A haymaking machine comprising a frame and at least one rake member supported on the frame and rotatable about an upwardly extending axis, said member comprising a substantially central hub and a plurality of arms extending outwardly from said hub during normal raking operation, a tine group connected to the outer portion of each arm by a pivot connection and being freely pivotable about a first axis defined by that connection, said arms being connected to said hub by corresponding pivot means and each arm being freely movable about a second axis defined by said pivot means, said tine group having a center of gravity and adjustable weight means associated with that group, the location of said weight means being adjustable to change the location of said center of gravity and vary the working position of the tine group about said first axis.

3,992,864

METHOD OF AND APPARATUS FOR AUTOMATIC REATTACHMENT OF THREADS IN SPINNING MACHINES

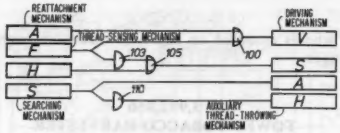
Wolfgang Igel, Ebersbach, Germany, assignor to Zinser Textilmaschinen GmbH, Ebersbach, Germany

Filed Oct. 9, 1974, Ser. No. 513,305

Claims priority, application Germany, Oct. 12, 1973, 2351312

Int. Cl.² D01H *15/00*

U.S. Cl. 57—34 R **10 Claims**



4. In an apparatus for the automatic repair thread breakage in spinning machines, which apparatus includes means for sensing a broken thread, means for searching for an end of a broken thread on a take-up thread holder, said means for searching being actuatable by said means for sensing, means for reattaching the thread which include means for pulling the thread into a traveler and a thread guide, and means for combining the thread with roving emerging from delivery rollers, the improvement comprising: means, responsive to output from said means for searching, for actuating said means for attaching whenever an end of a broken thread is located; and means, responsive to output from said means for searching, for supplying and fastening an auxiliary thread on said thread holder whenever an end of a broken thread is not located.

3,992,865

METHOD AND APPARATUS TO START INTERRUPT AND STOP SPINNING OF A FASCIATED SPUN YARN

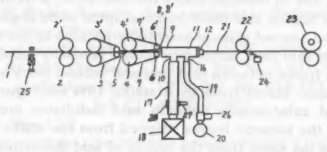
Nobuo Tuchida; Seiichi Yamagata; Masaaki Sakai; Itsuo Nakamura; Tadashi Kohara, all of Otsu; Syozo Morishita, Kyoto, and Satoshi Kukino, Otsu, all of Japan, assignors to Toray Industries, Inc., Tokyo, Japan

Filed July 29, 1975, Ser. No. 599,962

Claims priority, application Japan, Oct. 9, 1974, 49-115461; Nov. 22, 1974, 49-133564; Feb. 19, 1975, 50-19916

Int. Cl.² D01H *5/26;* **D02E** *1/16*

U.S. Cl. 57—51 **27 Claims**



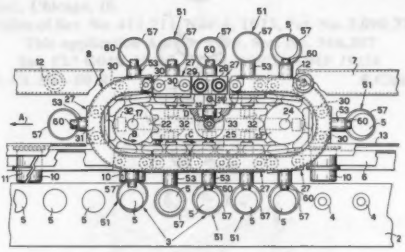
8. An apparatus for producing a fasciated spun yarn which comprises a feed means for feeding in a bundle of staple fibers, having a nip point arranged to nip said bundle of staple fibers, a fluid eddy nozzle having a suction effect at least temporarily on the occasion of starting spinning, the inlet of which is directly connected to a suction tube having a branch pipe connected to a suction apparatus, and means arranged and connected to cut off temporarily a suction air current flowing inside the branched pipe on the occasion of starting spinning.

3,992,866

DOFFING MECHANISM FOR SPINNING AND TWISTING FRAMES

Natale Chiari; Valerio Calabria, and Giuseppe Inverardi, all of Cologne Bresciano (Brescia), Italy, assignors to Edera Officina Meccanica Tessile S.p.A., Milan, Italy

Filed Nov. 3, 1975, Ser. No. 628,238
Claims priority, application Italy, Jan. 9, 1975, 19124/75
Int. Cl.² D01H 9/10
U.S. Cl. 57—53 6 Claims



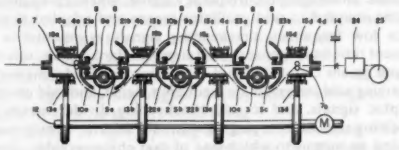
1. A bobbin-doffing mechanism for spinning and twisting frames, characterized in that it comprises a carriage which can be rectilinearly displaced from one end to the other of a spindle line, said carriage including a base frame, a succession of gripping members normally maintained in the raised position relative to the spindle front and can be horizontally displaced as an entity with respect to the base frame at a relative speed equal to that of the carriage relative to the spindle front so as to go along a substantially elliptical path having two longitudinal branches parallel to the spindle line, one of which is nearer to the spindle line and has a motion non concordant with that of the carriage and the other farther from the spindle line and having a motion concordant with that of the carriage, and control means sequentially to cause the fall in the open condition, the closure and the ascending motion of the gripping members along the nearside branch of the path for taking the bobbins out of their spindles and the temporary reopening of the gripping members along the farside branch of the path for discharging the doffed bobbins.

3,992,867

TWO-FOR-ONE TWISTING PROCESS

Wolfgang Hartig, Remscheid, and Dietrich Berges, Marienheide, both of Germany, assignors to Barmag Barmer Maschinenfabrik Aktiengesellschaft, Wuppertal, Germany

Filed Feb. 11, 1975, Ser. No. 549,089
Claims priority, application Germany, Feb. 12, 1974, 2406667
Int. Cl.² D01H 7/86
U.S. Cl. 57—156 5 Claims



1. A two-for-one twisting process for twisting a plurality of individual strands which comprises:

taking off the individual strands from separate feed packages mounted at spaced positions along rotatably driven hollow shafts which define a common twisting axis;

guiding the individual strands into and along the twisting axis where they are plied with each other in sequence as they pass each feed package; and

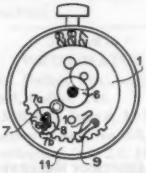
deflecting the plied strands outwardly in a rotating return balloon around the final feed package to cross the twisting axis and then outwardly again in a rotating return balloon around each preceding feed package, the plied strands crossing the twisting axis after each feed package until they are drawn off from the balloon rotating around the first feed package.

3,992,868

TIMEPIECE WITH CALENDAR MECHANISM

Munetaka Tamaru, Tokyo; Kazunari Kume; Minoru Watanabe, both of Tokorozawa; Hideshi Oono, and Hideo Sato, both of Sayama, all of Japan, assignors to Citizen Watch Co., Ltd., Tokyo, Japan

Filed Feb. 27, 1975, Ser. No. 553,624
Claims priority, application Japan, Mar. 5, 1974, 49-25466
Int. Cl.² G04B 19/24; G04C 3/00
U.S. Cl. 58—5 5 Claims



1. An electronic timepiece with a calendar mechanism including a calendar display, wherein the timepiece has an electrically driven movement powered by an electric current, the electrically driven movement including an electromechanical transducer for converting said electrical energy into torque for driving said calendar mechanism to change the display, said electronic timepiece characterized by:

a source of electrical energy;

a calendar gear wheel including in said calendar mechanism and driven to rotate by said electromechanical transducer;

a calendar feeding spring means disposed on said calendar gear wheel and driving said calendar display upon rotation of said calendar gear wheel;

means for mounting said spring means to deflect a predetermined amount in response to a predetermined torque on said calendar gear wheel;

a normally open electrical path;

means for closing temporarily said electrical path upon deflection of said spring means the predetermined amount to complete a circuit through said path, and to thereby generate a detection signal;

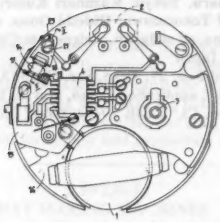
means for controlling the energy supplied to the transducer, said controlling means connected in said electrical path and to said electromechanical transducer between said electromechanical transducer and said source, wherein said means increases the amount of electrical energy delivered to said transducer by said source as long as said path is closed.

3,992,869

ELECTRONIC TIMEPIECE

Rene Meister, Neuchatel, Switzerland, assignor to Ebauches S.A., Neuchatel, Switzerland

Filed Nov. 25, 1974, Ser. No. 526,843
Int. Cl.² G04C *3/00*; H01G *1/02*; H03B *3/04*
U.S. Cl. 58—23 AC **2 Claims**



1. In an electronic timepiece the improvement comprising an oscillating circuit having a resonator for developing a frequency and a capacitor for adjusting said frequency, said capacitor being removably mounted on a support, so as to be able to be easily removed and replaced by another one, of different value, that permits the adjustment of the running of the timepiece by the adjustment of the frequency of the resonator, said capacitor being maintained in place by small plates which ensure its electric connection with the resonator and with circuit means in said oscillating circuit, one of said small plates being provided with an elongate aperture traversed by a securing screw, said screw being released to remove said plate and release said capacitor.

3,992,870

WATERTIGHT NONCONDUCTIVE ELECTRONIC WATCHCASE INCLUDING CONDUCTIVE INTERNAL PLATE

Joseph Dekel, 4532 Jubilo Drive, Tarzana, Calif. 91356

Filed Aug. 14, 1975, Ser. No. 604,844
Int. Cl.² G04B *37/00*; G04C *3/00*; G04B *37/08*
U.S. Cl. 58—23 BA **10 Claims**

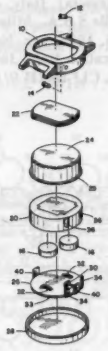
1. A watchcase for an electronic timing device powered by included electrical energy cells, said device having contact areas for completing an electrical path from said energy cells to said contact areas on manual activation of an associated pushbutton to present a visual display comprising:

a housing formed of an electrically insulating material receiving said timing device therein, said housing having at least one opening therethrough for mounting said manually actuated pushbutton;

an electrically conductive plate dimensioned to fit within said housing and engaging said device to electrically contact said energy cells;

said plate having at least one resilient contact extending therefrom to a position between said pushbutton and said contact area and out of contact with the latter;

whereby said resilient contact completes an electrical path from said energy cell to said contact area only during actuation of said pusbutton.

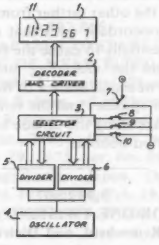


3,992,871

CHRONOGRAPH WRISTWATCH

Hitomi Numabe, Suwa, Japan, assignor to Kabushiki Kaisha Suwa Seikosha, Tokyo, Japan

Filed Oct. 9, 1973, Ser. No. 404,452
Claims priority, application Japan, Oct. 9, 1972, 47-101231
Int. Cl.² G04C *19/02*; G04B *19/30*, *27/00*; G04R *19/06*
U.S. Cl. 58—39.5 **16 Claims**



1. An electronic timepiece for generating relatively high frequency time standard signals; chronographic divider means coupled to said oscillator means and adapted to produce low frequency chronographic signals representative of elapsed time in response to said time standard signals, said chronograph divider means also being adapted to produce an intermediate chronographic frequency signal; timekeeping divider means coupled to said oscillator means and adapted to produce low frequency timekeeping signals representative of present time in response to said time standard signals; selector circuit means coupled to said chronographic divider means for receiving said intermediate frequency signal, and said chronographic signals, and to said timekeeping divider means for receiving said timekeeping signals, said selector circuit means having an output to which one of said chronographic signals and timekeeping signals are selectively applied; and digital display means coupled to the output of said selector circuit means for displaying either an elapsed or present time dependent on the signals supplied by said selector circuit means, said display means including visual indication means selectively disposable in a preselected visual mode representative

of chronograph operation, said selector circuit means actuating said indication means upon the selective coupling of said chronograph divider means output to said display means, said visual indication means receiving said intermediate frequency signal to effect a blinking of said visual indication means during chronograph operation.

3,992,872

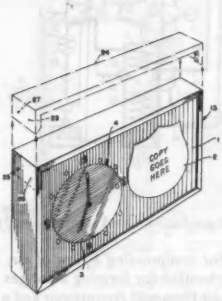
DISPLAY DEVICE

Robert B. Stanish, Chicago, Ill., assignor to Poster Products, Inc., Chicago, Ill.

Division of Ser. No. 411,711, Nov. 1, 1973, Pat. No. 3,890,777. This application Apr. 9, 1975, Ser. No. 566,357

Int. Cl.² G04B *19/30, 37/00, 19/02;* **G04F** *19/34*

U.S. Cl. 58—50 R **8 Claims**



1. A display device comprising:

A panel having a display area and a display at said display area;

said panel being mounted in a housing containing channels to hold the sides of said panel in sliding relationship so as to permit the removal of said panel and its replacement by another display panel without otherwise affecting the display device and said panel being slightly flexible permitting it to be bowed outwardly in mounting it and removing it from said housing;

illuminating means mounted back of said panel to cause light to be transmitted through said display area; and

a plurality of discs mounted for rotation in front of said illuminating means to the rear of said panel and one side of said display, said discs having radial light transmitting sections and being aligned so that light from said illuminating means passes through said light transmitting sections, and means to cause the rotation of said discs to produce a flashing orbital radial light.

3,992,873

LOW POWER UNIFORM HIGH LUMINOUS INTENSITY DIGITAL DISPLAY

Rockland Karl Awalt, San Jose, Calif., assignor to International Product Development Incorporated, Palo Alto, Calif.

Filed May 19, 1975, Ser. No. 578,697

Int. Cl.² G04B *19/30;* **G09B** *13/00*

U.S. Cl. 58—50 R **23 Claims**

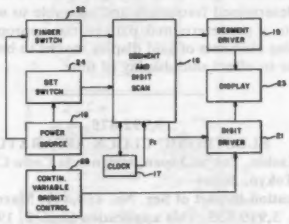
1. A light emitting digital display circuit energized by a source of electric power, comprising

a plurality of light emitting devices for providing discrete light emitting segments responsive to electric current passing therethrough

a digit array formed by relative physical positioning of said discrete light emitting segments so that a plurality of light emitting alphabetical and numerical symbols may be formed by predetermined combinations of selected ones of said light emitting segments

means operating at a first frequency for enabling said digit array for a first period determined by said first frequency,

means for scanning said light emitting segments at a second frequency for coupling each of said selected ones of said segments in sequence to the source of electric power for a second period determined by said second frequency within said first period,



means for controlling the luminous intensity of light emitted by each of said selected ones of said segments to substantially the same level relative to ambient light,

a switch for selectively providing an actuating signal for said digit array,

whereby said digit array produces an illuminated symbol having uniform light intensity from all segments in the symbol when said actuating signal is provided while said digit array is enabled.

3,992,874

WRIST WATCH

Dean Robert Collins, Dallas, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Division of Ser. No. 368,372, June 8, 1973, Pat. No. 3,938,318, which is a continuation of Ser. No. 68,207, Aug. 31, 1970, abandoned. This application July 23, 1975, Ser. No. 598,499

Int. Cl.² G04C *3/00;* **G04B** *19/30*

U.S. Cl. 58—50 R **9 Claims**

1. An electronic timekeeping device comprising in combination:

a case,

battery means associated with said case for powering said timing device,

display means mounted within said case, said display means being visible from without said case and including a plurality of passive display elements arranged to effect a preselected display in response to energization of selected ones thereof,

means for selectively coupling said passive display elements to said battery means,

light generating means positioned within said case for illuminating said passive display elements, said light generating means being coupled to said battery means for energization thereof, and

a low power electronic timing system mounted within said case and coupled to said battery means for energization thereof, said timing system comprising an oscillator timing source of a first predetermined frequency and circuit means operable in conjunction with said battery means to

apply electrical signals to selected of the display elements of said display means to effect a continuous display of time, said circuit means including a count-down chain circuit electrically connected to said timing source and operable to reduce said first predetermined frequency to a second predetermined frequency and a logic circuit electrically connected to the output of said count-down chain, said logic circuit being responsive to said second predetermined frequency and operable to select according to a predetermined pattern the appropriate passive display elements of said display means to be energized in order to effect said display of time.

3,992,875

ELECTRONIC CLOCK APPARATUS

Toshio Kashio, Tokyo, Japan, assignor to Casio Computer Co., Ltd., Tokyo, Japan

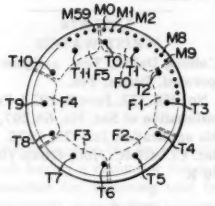
Continuation-in-part of Ser. No. 450,441, March 12, 1974, Pat. No. 3,919,835. This application Sept. 2, 1975, Ser. No. 609,511

Claims priority, application Japan, Mar. 15, 1973, 48-30412

The portion of the term of this patent subsequent to Nov. 18, 1992, has been disclaimed.

Int. Cl.² G04B *19/30*

U.S. Cl. 58—50 R **3 Claims**



1. An electronic clock apparatus comprising:

a source of standard clock signals;

a time counting device counting said standard clock signals and generating hour, minute and second signals;

12 first indicating elements each of which has a pair of electrodes and which are divided into six groups, each group being constituted by two elements, and arranged in a closed loop so as to be responsive to an hour signal from the time counting device;

60 second indicating elements each of which has a pair of electrodes and which are divided into six groups each constituted by ten elements and arranged in a closed loop so as to indicate both minutes and seconds in response to a minute signal and a second signal from the time counting device;

six first connecting means connecting one of the electrodes of each first indicating element of each group to one of the electrodes of each second indicating element of the respective group, thus forming six units each consisting of two first indicating elements and 10 second indicating elements;

12 second connecting means each connecting the other electrodes of the first and second indicating elements of each unit to the corresponding other electrodes of the first and second indicating elements of the other units; and

a time division control means coupled to the time counting device for selectively supplying in a time division fashion the hour, minute and second signals from the time counting device to the corresponding first and second indicating elements via the first and second connecting means.

3,992,876

COMBINED GAS TURBINE AND STEAM POWER PLANT

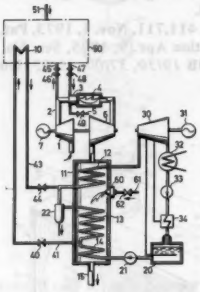
Emile Aguet, Winterthur, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Jan. 13, 1975, Ser. No. 540,501

Claims priority, application Switzerland, Jan. 15, 1974, 493/74

Int. Cl.² F02C *7/02*; F02B *43/00*

U.S. Cl. 60—39.12 **3 Claims**



1. A combined gas turbine and steam power plant comprising

a compressor for compressing a flow of air;

a combustion chamber for forming a hot gas from a flow of compressed air from said compressor and a supply of fuel;

a gas turbine for receiving a flow of hot gas from said combustion chamber;

a steam generator connected to said gas turbine to receive a flow of exhaust gas therefrom, said generator having a superheater, evaporator and feed-water preheater consecutively disposed in the flow path of the exhaust gas;

a thermal preparation plant for fuel having a chamber for removing impurities from the fuel, said preparation plant being connected to said combustion chamber to supply fuel thereto;

a heat exchanger within said thermal preparation plant, said heat exchanger being connected in parallel with said evaporator relative to a flow of working medium through said preheater, evaporator and superheater for producing steam at the same pressure as in said evaporator for delivery to said superheater and for cooling the fuel supplied from said thermal preparation plant to said combustion chamber;

a second fuel supply connected to said combustion chamber for supplying fuel thereto independently of said thermal preparation plant; and

a burner disposed in said steam generator between said superheater and said evaporator, said burner having a fuel supply independent of said thermal preparation plant.

3,992,877

COMBUSTION GAS PRESSURE GENERATOR

Charles C. Granger, 1203 Chestnut St., Henderson, N.C. 27536

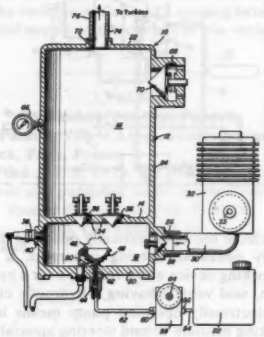
Filed Mar. 10, 1975, Ser. No. 556,864

Int. Cl.² F02C *5/12*, *7/22*

U.S. Cl. 60—39.68 **3 Claims**

1. A combination gas pressure generator comprising an upstanding vertically elongated hollow closed pressure housing having an internal generally horizontal partition dividing the interior of said housing into first and second lower and upper chambers, said first chamber including a horizontally inwardly opening pressurized gas inlet, an upwardly opening liquid fuel reservoir within said first chamber and including

check valve controlled liquid fuel inlet means opening upwardly into a lower portion of the interior of said reservoir, fuel supply means operative to supply liquid fuel under pressure to said fuel inlet means, the open top of said reservoir being generally aligned with said pressurized gas inlet, ignition means in said first chamber and also positioned in general alignment with said pressurized gas pressure inlet on the side of said reservoir remote from said pressurized gas pressure inlet, said partition including check valve controlled gas pressure transfer ports communicating said first chamber with said



second chamber, said second chamber including upwardly and outwardly opening combustion gas outlet means opening through the upper end of said housing, the effective flow rate of said gas outlet means being less than the effective flow rate of said gas pressure transfer means, said gas inlet for said first chamber including check valve means operative to prevent reverse flow of gas outwardly of said inlet, and heating means operatively associated with said receptacle for heating the latter to an extent operative to vaporize fuel supplied to said reservoir.

3,992,878

ENGINE SECONDARY AIR FLOW CONTROL SYSTEM

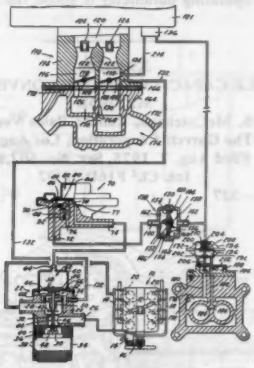
James W. Moorman, Inkster, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Oct. 3, 1975, Ser. No. 619,341

Int. Cl.² F02B 75/10

U.S. Cl. 60—278 **12 Claims**

1. An airflow control system for an internal combustion engine having an engine driven air pump with a discharge outlet delivering air to the engine, a selectively operable air bypass valve associated with the outlet when operable movable to a dump position diverting air from the outlet, the valve being rendered operable in response to engine manifold vacuum acting thereon at engine deceleration vacuum levels, the engine having a carburetor providing a throttle valve ported vacuum signal varying from an atmospheric pressure level to manifold vacuum levels as a function of the opening movement of the throttle valve from a closed position, control means responsive to a ported vacuum signal above a predetermined vacuum force level to render the bypass valve inoperable and responsive to a vacuum signal below the predetermined level to render the bypass valve operable, and vacuum delay means associated with the control means for delaying the rendering of the bypass valve operable upon a decrease in



the vacuum signal force level from above to below the predetermined level and below the deceleration level.

3,992,879

EXHAUST GAS CLEANER

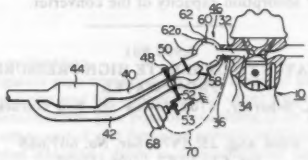
Yukio Miyamori; Kenji Masaki, and Shuya Nambu, all of Yokohama, Japan, assignors to Nissan Motor Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 419,927, Nov. 29, 1973, abandoned. This application Nov. 20, 1975, Ser. No. 633,685

Claims priority, application Japan, Nov. 30, 1972, 47-120173

Int. Cl.² F02B 75/10

U.S. Cl. 60—288 **6 Claims**



1. An exhaust gas cleaner for an internal combustion engine having an exhaust port, comprising:

exhaust passage-way means communicated with the exhaust port;

a thermal reactor connected to said exhaust passage-way means;

first pipe means connected at one end thereof to said thermal reactor;

a catalytic converter connected to the other end of said first pipe means;

second pipe means connected at one end thereof to said thermal reactor and at the other end thereof to the atmosphere;

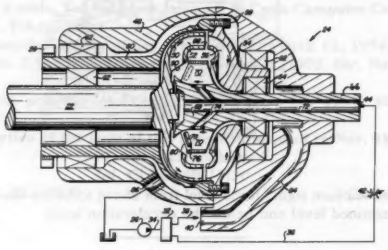
valve means including a first valve and a second valve, said first valve disposed within said first pipe means and arranged to be opened and closed for establishing and blocking communication between said thermal reactor and said catalytic converter, said second valve disposed within said second pipe means and arranged to be opened and closed for establishing and blocking communication between said thermal reactor and the atmosphere; and

control means arranged to open said first valve and close said second valve when a selected engine operating parameter is below a predetermined valve, and to close said first valve and open said second valve when said selected engine operating parameter is above the predetermined value.

3,992,880
VARIABLE CAPACITY TORQUE CONVERTER AND METHOD

Andrew R. S. McCutcheon, Rancho Palos Verdes, Calif., assignor to The Garrett Corporation, Los Angeles, Calif.

Filed Aug. 7, 1975, Ser. No. 602,852
Int. Cl.² F16D *33/02*
U.S. Cl. 60—327 **20 Claims**



1. A method of varying the power absorption capacity of a torque converter having an impeller and a turbine, comprising the steps of:

driving the impeller to induce a primary flow of fluid therefrom to said turbine to drive the latter;

returning said primary fluid flow from said turbine to the impeller;

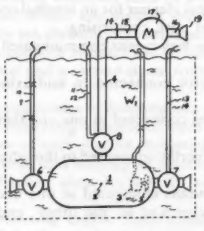
introducing a secondary flow of fluid into said primary fluid flow to alter the direction of the latter; and

varying the rate of said secondary fluid flow to vary the power absorption capacity of the converter.

3,992,881
APPARATUS TO GENERATE HIGH PRESSURE AIR FROM WATER

William A. Scherrer, 6700 Alvina St., Bell Gardens, Calif. 90207

Filed Aug. 25, 1975, Ser. No. 607,685
Int. Cl.² F15B *11/06, 21/00*
U.S. Cl. 60—398 **15 Claims**

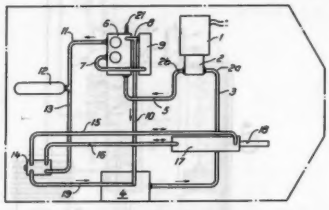


1. An apparatus to generate higher than atmospheric pressure gas from water, said apparatus comprising a water holding tank placed at a substantial water depth; a conduit leading from said water holding tank to an environment of lower natural pressure than the pressure at said water depth; a first valve valving the interior of the said water holding tank to the tank's exterior; a second valve valving the interior of the said water holding tank to the interior of the said conduit; a third valve valving the interior of the said water holding tank to the said tank's exterior, the said first valve and the said third valve adapted to in combination allow rapid replacement of water within the interior of the said water holding tank.

3,992,882
HYDRAULIC CIRCUIT

Ove Bodin, Box 54, 710 10 Fjugesta, Sweden

Filed June 4, 1975, Ser. No. 583,570
Claims priority, application Sweden, June 5, 1974, 7407386
Int. Cl.² F15B *1/02*
U.S. Cl. 60—413 **6 Claims**



1. In a vehicle having electrically operated drive means, a hydraulically operated steering apparatus, a hydraulically operated working device and a reservoir for a hydraulic working medium, said vehicle having a hydraulic circuit wherein the same electrically operated pump means is arranged to supply working medium to said steering apparatus and to said working device, said hydraulic circuit comprising a hydraulic working medium distributing means, a system of pipes connecting said steering apparatus to said distributing means, a working medium accumulating device, means for sensing the pressure in said pipe system, said pressure sensing means being arranged to co-act with the pump means in a manner such that when a pre-determined low pressure value prevails in the system, the pump means is activated, said pump means being de-activated when a pre-determined high pressure value prevails, a steering control valve connected to a steering wheel forming part of the steering apparatus of said vehicle and to a hydraulic cylinder for fixing the extent to which said vehicle is turned, said control valve being arranged to prevent flow of working medium when said valve occupies a neutral position, and at least two electrically operated means for directing flow of working medium through said working medium distributing device connected to said working medium distributing device, at least one of said electrically operated means being in a normally closed position to prevent flow of working medium but arranged to open and cause low pressure in the feeding pipe connecting said pump means to said distributing means when the pump means is activated.

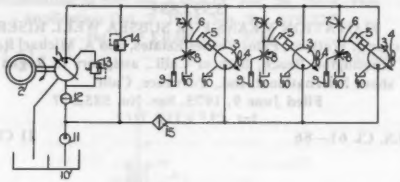
3,992,883
FAN DRIVE SYSTEMS

Raymond Cope, Birmingham, England, assignor to Lucas Industries Limited, England

Filed Oct. 1, 1975, Ser. No. 618,532
Int. Cl.² F15B *11/20*
U.S. Cl. 60—456 **2 Claims**

1. A fan drive system comprising a fluid pump, a plurality of fluid motors for driving a plurality of fans, said fluid motors being of variable capacity and being connected in parallel with each other and in a series, constant pressure circuit with the pump, and temperature sensitive means operably associated with each of the motors for controlling the speed of rotation of the respective motor by varying the capacity thereof whereby, in use, the speed of rotation of each fan can be varied separately in accordance with temperature, each tem-

perature sensitive means comprising a temperature sensitive probe arranged to control the restriction of a variable orifice, the variable orifice being disposed in parallel circuit with its



associated motor, there being a fixed orifice on the high pressure side of the variable orifice and a tapping between the two orifices for fluid supply to the control of the variable capacity motor.

3,992,884

THERMAL POWER PLANT

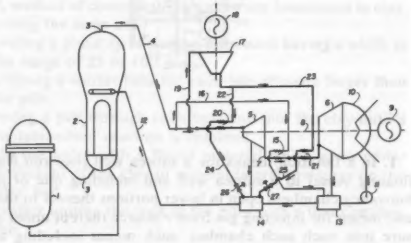
Pierre Henri Pacault, Ville d'Avray, France, assignor to Fives-Cail Babcock, Paris, France

Filed Jan. 3, 1975, Ser. No. 538,472

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 3, 1976

Int. Cl.² F01K *21/00*

U.S. Cl. 60—645 **14 Claims**



1. In a method of operating a thermal power plant in which steam at a predetermined pressure is generated in a steam generating zone, and generated steam is expanded in an engine to produce mechanical work, the improvement which comprises withdrawing a first portion of the generated steam from said zone, compressing said first portion to a pressure higher than said predetermined pressure in a manner to increase the temperature of the compressed steam, and transferring thermal energy from said compressed first portion to a second portion of said generated steam prior to expanding said second portion in said engine.

3,992,885

DRIVE ARRANGEMENT FOR THE AUXILIARY AGGREGATES OF A MOTOR VEHICLE

Hans-Joachim M. Forster, Stuttgart, Germany, assignor to Daimler-Benz Aktiengesellschaft, Germany

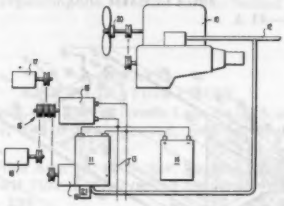
Filed Apr. 9, 1975, Ser. No. 566,327

Claims priority, application Germany, Apr. 10, 1974, 2417434

Int. Cl.² F01B *21/00;* **F02D** *29/06*

U.S. Cl. 60—698 **10 Claims**

1. A drive arrangement for auxiliary aggregates of a motor vehicle equipped with an internal combustion engine, which comprises an electrical power supply means including a generator means and a battery means, characterized in that only the auxiliary aggregates having a power requirement dependent on rotational speed are operable to be driven by the internal combustion engine whereas the auxiliary aggregates having a power requirement substantially independent of rotational speed are operable to be driven from an electric motor rotating at substantially constant rotational speed and fed from the power supply means, and in that a thermionic converter means operable with the fuel of the motor vehicle is provided as generator means.



3,992,886

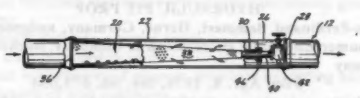
IRRIGATION GRAVEL GUARD AND CLEAN-OUT MEANS THEREFOR

Robert A. Scott, 1427 Newcastle Road, No. 122, Grand Island, Nebr. 68801

Filed Apr. 23, 1976, Ser. No. 679,856

Int. Cl.² E02B *13/00*

U.S. Cl. 61—12 **6 Claims**



1. In combination,

an irrigation pipe comprising a first elongated pipe portion having one end for connection to other irrigation pipes, an intermediate pipe portion extending at an angle from the other end of said first pipe portion, and a second pipe portion extending from said intermediate pipe portion parallel to said first pipe portion, said second pipe portion having an end portion for connection to other irrigation pipes,

a hollow tubular member secured to said intermediate pipe portion and extending outwardly therefrom, said tubular member being aligned with the central longitudinal axis of said first pipe portion, said tubular member being in communication with the interior of said intermediate pipe portion,

a gravel screen positioned in said first pipe portion, said screen being substantially truncated conical in shape and having first and second ends, said first end of said screen being open and having a diameter substantially equal to the interior of said first pipe portion, said second end of said screen having a diameter less than said first end thereof,

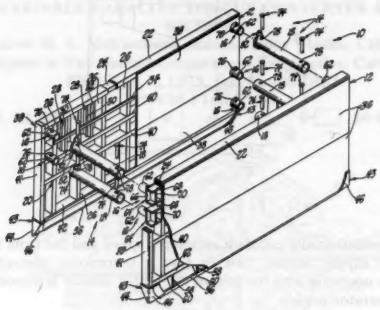
a pipe stub secured at one end to said second end of said screen and extending therefrom through said tubular member in a sealed relationship thereto,

and closure means on the second end of said pipe stub for selective opening of said second end of said pipe stub to permit the gravel in the interior of said screen to be flushed outwardly therefrom through said pipe stub.

3,992,887
TRENCH SHORING ASSEMBLY WITH FORCE TRANSFERRING ACCESSORY

Walter A. Fisher, Coldwater, Mich., assignor to Griswold Machine & Engineering, Inc., Union City, Mich.

Filed Feb. 9, 1976, Ser. No. 656,146
Int. Cl.² E21D 5/00
U.S. Cl. 61—41 A **6 Claims**

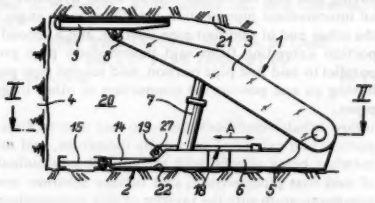


1. A trench shoring assembly of the type including a pair of interconnected spaced wall means, said assembly comprising; wall means defined by interconnected structural members including a hollow metal beam member extending longitudinally along the top of said wall means, and force transferring and absorbing means substantially filling said hollow beam member thereby preventing the collapse of said hollow beam member as the top of said wall means is pounded.

3,992,888
HYDRAULIC PIT PROP

Hans-Ferdinand Bemmerl, Herne, Germany, assignor to Bochumer Eisenhutte Heintzmann & Company, Bochum, Germany

Filed Apr. 8, 1976, Ser. No. 675,054
Claims priority, application Germany, Apr. 15, 1975, 2516394
Int. Cl.² E21D 15/44
U.S. Cl. 61—45 D **10 Claims**

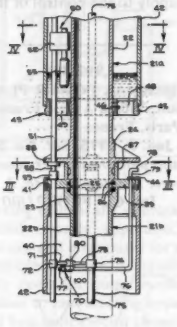


1. A pit prop comprising: a central elongated skid adapted to lie on the floor and having a front end securable to a support; a pair of generally parallel elongated feet flanking said skid and each having a front portion adapted to be turned toward a working face and of predetermined width and a rear portion adapted to be turned away from said face and of predetermined width substantially smaller than the width of said front portion; a slide fluid cylinder having one end secured to said front portions and another end secured to said skid, whereby extension or contraction of said slide cylinder displaces said feet relative to said skid; a roof support having a shield engageable against the roof and a rear end pivoted on said rear portions of said feet; and a lift fluid cylinder on each of said front portions and each engaging said roof support, whereby extension of said lift cylinders can press said shield tightly against said roof.

3,992,889
FLOTATION MEANS FOR SUBSEA WELL RISER

Bruce J. Watkins, Palos Verdes Estates, and A. Michael Regan, Huntington Beach, both of Calif., assignors to Regan Offshore International, Inc., Torrance, Calif.

Filed June 9, 1975, Ser. No. 585,377
Int. Cl.² E21B 7/12
U.S. Cl. 61—86 **21 Claims**



1. In a flotation means for a subsea well riser run from a floating vessel to a subsea well and including one or more buoyancy chambers open in lower portions thereof to the sea and means for injecting gas from a source thereof under pressure into each such chamber, such means including a gas injection line run from said vessel to each said chamber, the improvement comprising the provision of:

gas bleeding means operable from said vessel for bleeding off gas from within each of said chambers to reduce the buoyancy thereof;

an injection valve for each of said chambers and operatively connected to said gas injection line, and normally closed check valve means associated with each of said injection valves adapted to open when the pressure of the gas in said injection line is above a predetermined amount to thereby admit gas from said injection line into each said chamber when said gas pressure in said injection line exceeds said predetermined amount; and

wherein said gas bleeding means includes pilot means adapted to selectively control the bleeding off of gas from within each of said chambers when the pressure of gas in said injection line is less than a predetermined amount,

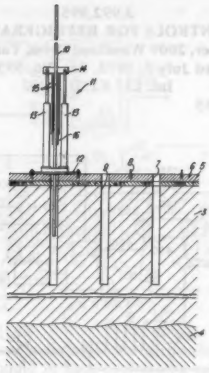
said pilot means further includes gas bleed valve means having an inlet opening to the interior of each of said chambers and an outlet opening to the exterior thereof, and pilot valve means operatively connected to said gas bleed valve means for operating said gas bleed valve means between open and closed positions and further wherein:

said pilot valve means includes piston means operatively connected to said gas bleed valve means for moving said gas bleed valve means between its open and its closed position and a pilot line operatively connected at one end to a source of gas under controllable pressure at said vessel and at the other end to said piston means.

3,992,890
METHOD OF FORMING FOUNDATIONS

David S. Pryke, Brent Pelham, England, assignor to Pynford Limited, England

Continuation of Ser. No. 436,923, Jan. 28, 1974. This application Oct. 2, 1975, Ser. No. 619,237
Int. Cl.² E02D 5/24, 7/20
U.S. Cl. 61—50 12 Claims

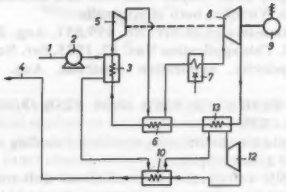


1. A method of constructing an open site foundation in clay, comprising the steps of:
providing a plurality of slender piles each having a width in the range of 25 to 100 mm.;
pre-boring a starter hole for each pile of a size larger than the pile;
inserting a pile through each hole and into the clay until a predetermined reaction is obtained;
filling the holes with a fluent material which gives under movement of the clay to prevent lateral pressures on the piles; and
thereafter uniting the tops of the piles with a thin concrete slab.

3,992,891
PROCESS FOR RECOVERING ENERGY FROM LIQUEFIED GASES

Anton Pocrnja, Munich, Germany, assignor to Linde Aktiengesellschaft, Wiesbaden, Germany

Filed Feb. 18, 1975, Ser. No. 550,590
Claims priority, application Germany, Feb. 16, 1974, 2407617
Int. Cl.² F17C 7/02
U.S. Cl. 62—53 9 Claims

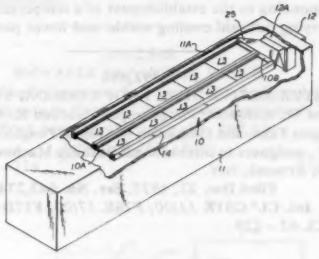


1. In a process for recovering the energy from a liquefied gas by evaporation in heat exchange with a closed cycle medium which is simultaneously cooled, said cycle medium being thereafter compressed, heated by indirect heat exchange, subjected to engine expansion and recovered in a cyclical manner,
the cycle being operated so that the cycle medium remains in the gaseous phase through the entire cycle,
wherein the improvement comprises further heating resultant vaporized liquefied gas in indirect heat exchange with said cycle medium after said cycle medium has been engine expanded but before being cooled, and thereafter engine expanding the resultant further heated vaporized liquid.

3,992,892
AIR FILTRATION CHUTE

Bernard S. Sain, 811 Thread Needle Lane No. 285, and Jimmy H. Brieger, 14810 Bramblewood, both of Houston, Tex. 77024

Filed Aug. 13, 1975, Ser. No. 604,245
Int. Cl.² B60H 3/04; F25D 11/00; F25B 43/00; F24F 7/00
U.S. Cl. 62—239 12 Claims



1. An air filtration system for refrigerating perishable goods comprising:
a container defining a cargo space,
a rigid duct disposed in said container,
said duct including rigid support members extending along the length of said container,
a panel structure supported by said support members as a wall of said duct for defining an air passageway,
said duct having an inlet end adapted to be connected to a source of cold air,
said duct having a discharge end in communication with the cargo space of said container,
said panel structure comprising a plurality of individual and detachable panels, whereby selected ones of said panels may be removed and replaced as desired.

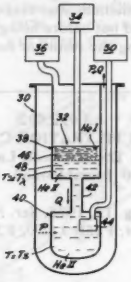
3,992,893
METHOD FOR THE PRODUCTION OF SUPERFLUID HELIUM UNDER PRESSURE AT VERY LOW TEMPERATURE AND AN APPARATUS FOR CARRYING OUT SAID METHOD

Gérard Claudet, Grenoble; Pierre Roubeau, Palaiseau, and Jacques Verdier, Meylan, all of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Feb. 11, 1975, Ser. No. 549,079
Claims priority, application France, Feb. 22, 1974, 74.06206
Int. Cl.² F25B 41/00
U.S. Cl. 62—113 13 Claims

1. A method for the production of superfluid helium under pressure at very low temperature, of the type in which a lower portion of a bath of helium-4 is cooled locally in order to cause its temperature to fall below the λ point, the lower portion of said bath being then converted into a superfluid-helium zone, wherein said method consists in connecting an upper portion of the superfluid zone to a lower portion of the

superfluid zone by means of narrow stream of superfluid helium and in imposing within said stream a critical heat flux



corresponding to the establishment of a temperature gradient by carrying out said cooling within said lower portion.

3,992,894

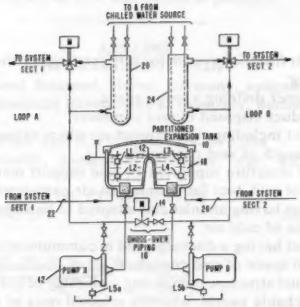
INTER-ACTIVE DUAL LOOP COOLING SYSTEM

Vincent W. Antonetti, Poughkeepsie; Gordon R. Arent, Wappingers Falls, and Omkarath R. Gupta, Poughkeepsie, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 22, 1975, Ser. No. 643,274

Int. Cl.² G01K *13/00*; F16K *37/00*; F17D *3/00*

U.S. Cl. 62—129 **10 Claims**



1. An inter-active dual-loop cooling system comprising:

a first and second cooling loop for supplying cooled liquid to first and second sections of the system to be cooled,

an expansion tank connected in said first and second cooling loops;

means for partitioning said expansion tank so that it is divided into sections which are common to both said first and second cooling loops in normal operation and serves as separate expansion tanks for said first and second cooling loops when a predetermined amount of leakage from one of said first and second cooling loops has occurred;

a first and second circulating pump associated with said first and second cooling loops;

crossover piping located between said first and second cooling loops at the output side of said pumps;

a normally open isolation valve located in said crossover piping for connecting said first and second loops so that one pump can provide circulation to both loops;

sensing means located in each expansion tank section for responding to a predetermined amount of leakage to produce shut-off of said isolation valve and turn-on of said second pump to provide two separate cooling loops each with its own pump;

and low level sensing means for responding to a further predetermined amount of leakage to shut down the associated section to be cooled and shut down the circulating pump associated with the respective cooling loop, thereby isolating the leaking cooling loop and maintaining the other cooling loop in operation.

3,992,895

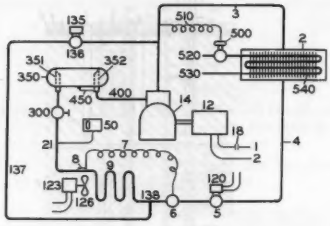
DEFROST CONTROLS FOR REFRIGERATION SYSTEMS

Daniel E. Kramer, 2009 Woodland Drive, Yardley, Pa. 19067

Filed July 7, 1975, Ser. No. 593,841

Int. Cl.² F25D *21/02*

U.S. Cl. 62—155 **7 Claims**



1. An improved refrigerating system including conduit connected compressor, condenser and a frosting evaporator, said evaporator having a motor driven fan, defrost means capable of acting on the evaporator to defrost it, wherein the improvement comprises; cyclic means adapted to stop the fan and simultaneously attempt to initiate defrost at predetermined times blocking and unblocking means acting to allow the cyclic means to initiate defrost and prevent the cyclic means from initiating defrost, permissive means operative connected to the blocking and unblocking means and positioned to sense a condition related to the amount of frost on the evaporator, said permissive means causing the blocking and unblocking means to block initiation of defrost on a first value of the condition and causing the blocking and unblocking means to unblock initiation of defrost on a second value of the condition, said first value being related to the presence of a lesser amount of frost on the evaporator, and said second value being related to the presence of a greater amount of frost on the evaporator.

3,992,896

AIR CONDITIONING SYSTEM

August Janson, 45 Faversham Road, Canterbury, Victoria, and Douglas John Chynoweth, 332 Maroondah Highway, Ringwood, Victoria, both of Australia

Continuation-in-part of Ser. No. 499,851, Aug. 22, 1974, abandoned. This application Nov. 17, 1975, Ser. No. 632,827

Claims priority, application Australia, Aug. 22, 1973, 4581/73

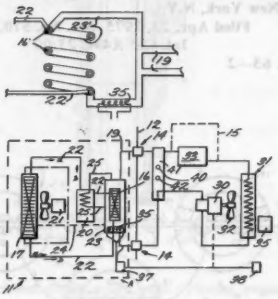
Int. Cl.² F25B *27/02*; F25D *19/00*; F25B *13/00*, *39/04*

U.S. Cl. 62—238 **13 Claims**

1. A mobile air-conditioning system for cooling and heating an enclosed area comprising

a. a mobile refrigerant air-conditioner unit movably disposed within said enclosed area to be cooled or heated, said unit including (i) a first heat exchanging means, having refrigerant circulating therethrough, for serving as a condenser during enclosure cooling and serving as an evaporator during enclosure heating, (ii) a second heat exchanging means having refrigerant circulating therethrough and operatively connected to said first heat exchanging means and for serving as an evaporator during

enclosure cooling and as a condenser during enclosure heating, (iii) a fan operatively cooperating with said second heat exchanging means, (iv) a compressor operatively cooperating with said first and second heat exchanging means for compressing refrigerant circulating therethrough, and (v) a liquid source means in heat exchanging relationship with said first heat exchanging means for placing cooling liquid in heat exchanging relationship with said first heat exchanging means to cool the



refrigerant therein during enclosure cooling and for placing heating liquid in heat exchanging relationship with said first heat exchanging means to heat the refrigerant therein during enclosure heating,

b. a liquid supply system located exteriorly of said enclosure for supplying liquid to said liquid source means at least during enclosure cooling, and

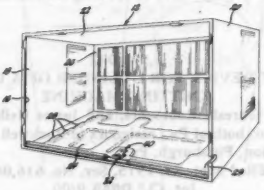
c. a heating coil or the like for heating liquid in or supplied to said liquid source means.

3,992,897

ROOM AIR CONDITIONER GROUNDING CLIP

John H. Loos, Dayton, Ohio, assignor to General Motors Corporation, Detroit, Mich.

Filed Sept. 2, 1975, Ser. No. 609,216
Int. Cl.² F25D *23/12*
U.S. Cl. 62—262 **3 Claims**



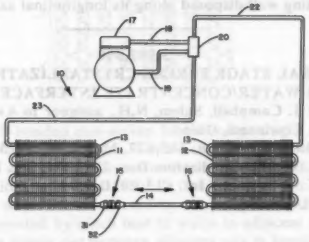
1. A grounding clip made of spring steel material for use with electrical appliances having an outer cabinet of electrical conductive material with an access opening at one end thereof, an inner chassis removably positioned in said cabinet, including a substantially horizontally disposed base pan of electrically conductive mate.ial supporting an operating system including electrical conductive components connected to ground, a rectangular work opening and adjacent hole formed in the bottom wall of the cabinet, the hole being symmetrical with and located a predetermined distance from the inboard transverse edge of the work opening, said clip comprising a single sheet of metal bent upon itself to provide a U-shaped spring with a flat base having an upwardly directed free end, a resilient body plate inclined to and rising from the opposite end of said base, said base having a tang struck downwardly therefrom away from said base free end at an acute angle and adapted to be positioned within said cabinet hole, resilient tongues lanced from each side of said base and adapted to engage the underside of said bottom wall and act as leaf springs to clamp said base to the upper side of said bottom wall, each said tongue being bent normal from its point of attachment with said base to form a stop adapted to engage said work opening transverse edge upon said tang being positioned in said cabinet hole, said tongues being upwardly curved in longitudinal section and having sharp-cornered upwardly extending barbs lanced therefrom for digging into in an electrically contacting manner the underside of the cabinet bottom wall, and said body plate having an upwardly extending substantially cylindrical portion struck therefrom with sawtoothed contact means on the upper end thereof adapted to resiliently engage and dig into the bottom surface of the chassis pan upon the chassis being slid into the access opening to electrically ground the cabinet through the electrical conductive components.

3,992,898

MOVABLE EXPANSION VALVE

Richard J. Duell, Syracuse, N.Y., and John A. Ferrel, Tulsa, Okla., assignors to Carrier Corporation, Syracuse, N.Y.

Filed June 23, 1975, Ser. No. 589,216
Int. Cl.² F25B *13/00*
U.S. Cl. 62—324 **5 Claims**



1. In a reversible refrigeration system having a compressor, a first heat exchanger and a second heat exchanger being selectively connected to the compressor, switching means for selectively connecting the inlet and discharge side of the compressor between said exchangers and a refrigerant supply line for delivering refrigerant from one exchanger to the other, the improvement comprising

an expansion device mounted in the supply line at the entrance of the supply line to each exchanger having an elongated body coaxially aligned with the supply line and having a central flow passage passing therethrough, the passage opening into an expanded chamber contained within said body, and

a free-floating piston slidably mounted within the chamber having a flow metering port passing therethrough for throttling refrigerant and a series of axially aligned channels formed in the outer periphery of the piston, the piston being arranged to move to a first position against one side wall of the chamber when the refrigerant flow passing through the supply line is toward said exchanger entrance wherein the channels are closed against said one side wall of the chamber and refrigerant is throttled through the metering port into said exchanger entrance and to move to a second position when the flow is in the opposite direction wherein refrigerant flows in an uninterrupted manner through said channels into said supply line.

3,992,899
DEVICE FOR COOLING BULK MATERIAL BY LOW-BOILING LIQUEFIED GAS

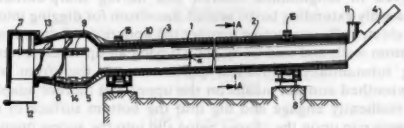
Walter Spahn, Frankfurt am Main, Germany, assignor to Messer Griesheim GmbH, Frankfurt am Main, Germany

Filed May 1, 1975, Ser. No. 573,754

Claims priority, application Germany, May 31, 1974, 2426459; Oct. 8, 1974, 2447838

Int. Cl.² F25D *17/02*

U.S. Cl. 62—374 **13 Claims**



1. In a device for the cooling of bulk material by low-boiling, liquefied gas in a precooling zone and a spraying zone, characterized in that the precooling zone is cylindrically shaped and inclined downwardly toward its discharge end, means for rotating said precooling zone about its longitudinal axis, said spraying zone being connected to and in flow communication with said discharge end of said precooling zone, said spraying zone being a drum-shaped chamber, means for rotating said chamber about its axis, spraying means in said chamber, a draining zone in said chamber, worm conveyor means in said draining zone, and said precooling cylinder being divided longitudinally into two symmetrical halves by a separating wall disposed along its longitudinal axis.

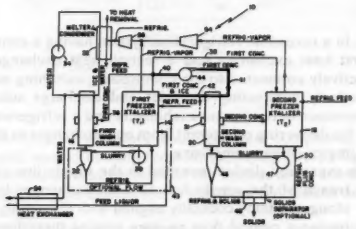
3,992,900
PLURAL STAGE FREEZE CRYSTALLIZATION WITH WASH-WATER/CONCENTRATE INTERFACE CONTROL

Robert J. Campbell, Salem, N.H., assignor to Avco Corporation, Cincinnati, Ohio

Division of Ser. No. 345,427, March 27, 1973, Pat. No. 3,885,399. This application Dec. 27, 1974, Ser. No. 536,803

Int. Cl.² B01D *9/04*

U.S. Cl. 62—541 **3 Claims**



1. In a method of purifying product by a freeze crystallization process wherein:

feed liquor is fed to a first stage comprising a freezer crystallizer and a wash column to produce first product crystals and a first concentrate;

first concentrate is fed to a second stage freezer crystallizer to produce a slurry comprising second product crystals and a second concentrate;

the slurry is fed to a second stage wash column having means for supplying a wash liquid to said second product crystals, said liquid consisting of said first concentrate, and an exit screen for removing the second concentrate;

supplying the wash liquid to the second product crystals situated above the screen in the second stage wash column and forming a wash liquid second concentrate interface above the screen so that the second concentrate completely covers the exit screen; and

removing the second concentrate and product crystals from the second stage wash column.

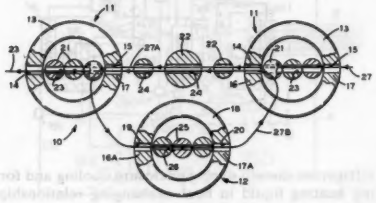
3,992,901
NECKLACE WITH OVERLAPPING ANNULAR MEMBERS AND STRING-CONCEALING MEMBERS

Michael Parente, New York, N.Y., assignor to Theresa Hammer, New York, N.Y.

Filed Apr. 23, 1975, Ser. No. 570,597

Int. Cl.² A44C *25/00*

U.S. Cl. 63—2 **8 Claims**



1. An ornamental necklace comprising a first group of linearly aligned spaced annular members and a second group of linearly aligned spaced annular members, said groups being laterally positioned with respect to each other, each annular member of the first group of annular members having portions thereof in overlapping relation to portions of a respective pair of annular members of the second group of annular members, each of the annular members being formed with aligned threading passages, means movably connecting the overlapping portions of each pair of adjacent annular members, threading means passing through the threading passages of said annular members, and a plurality of beadlike members strung on those portions of said threading means extending between said passages and concealing said threading means.

3,992,902
SUPPORT DEVICE FOR CYLINDER OF A CIRCULAR KNITTING MACHINE

Stephen G. Guresh, Robesonia, and James Heilig Boyer, Jr., Shillington, both of Pa., assignors to Rockwell International Corporation, Pittsburgh, Pa.

Filed Sept. 23, 1975, Ser. No. 616,088

Int. Cl.² D04B *9/00*

U.S. Cl. 66—8 **5 Claims**

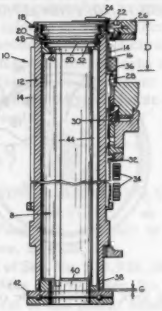
1. A support device for an elongated, rotatable needle cylinder of a circular knitting machine having vertically located stitch cams, said cylinder having an upper end which supports an array of sinkers at a predetermined height above said stitch cams and a lower end, said support device comprising:

a rotatable base portion located at said lower end of said cylinder and at a predetermined vertical distance below said stitch cams,

a vertical support structure fixed to said base portion and extending upwardly therefrom along an interior of said cylinder, and

an upper portion fixed to said vertical support structure and secured to said cylinder at said upper end, whereby

said lower end of said cylinder is free to move vertically with respect to said stitch cams to maintain said predetermined



height at a constant value when said cylinder expands and contracts.

3,992,903

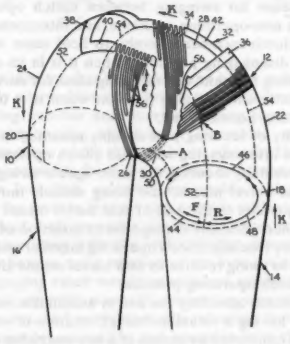
SEAMLESS GARMENT INCLUDING METHOD OF AND MACHINE FOR KNITTING THE SAME

Richard M. Janda, Reading, and Kenneth C. Williams, Sinking Spring, both of Pa., assignors to Rockwell International Corporation, Pittsburgh, Pa.

Division of Ser. No. 488,585, July 15, 1974. This application Jan. 27, 1975, Ser. No. 544,261

Int. Cl.² A41B *9/02, 9/04, 9/10*

U.S. Cl. 66—177 **19 Claims**



1. A one-piece, seamless garment knitted on a circular knitting machine comprising:

a body portion formed substantially during reciprocation of said machine to include a pair of leg receiving openings, a pair of side panels and a front panel and a rear panel joining at a crotch located between said leg receiving openings;

each of said front and said rear panels including adjacent to said crotch a plurality of knitting courses which terminate at course reversals which overlap said course reversals of said plurality of knitting courses of the other of said front and said rear panels at said crotch to provide said joining of said front and said rear panels; and

said each of said front and said rear panels having a region remote from said crotch which includes more knitting courses than said plurality of knitting courses adjacent to said crotch by some of said knitting courses at said remote region terminating at course reversals without extending to said crotch, said course reversals of said some of said knitting courses being dispersed about said front and said rear panels and separated one from another to prevent the formation of gore lines in said front and said rear panels.

3,992,904

NON-WOVEN FABRICS

Norman Stanley Webb, Oldham, and Gordon Dunbar, Rochdale, both of England, assignors to Courtaulds Limited, London, England

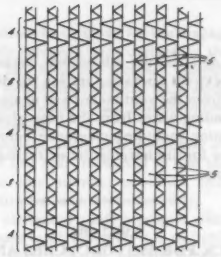
Filed Nov. 8, 1974, Ser. No. 522,227

Claims priority, application United Kingdom, Nov. 15, 1973, 52978/73

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 30, 1976

Int. Cl.² D04B *7/12, 7/14, 9/14, 13/00*

U.S. Cl. 66—190 **6 Claims**



1. A stitch-bonded non-woven fabric comprising a web of fibres stitch-bonded by wales of chain stitch loops on one side of the fabric which are interconnected on the other side of the fabric by stitch laps, wherein in a first group of successive courses the wales are connected by stitch laps in sets which are not connected by stitch laps to wales in adjacent sets so that the web stands out between adjacent sets in longitudinal stripes and in a second group of successive courses, consisting of less courses than the first group of courses, all the wales are connected by stitch laps so that in the second group of courses the said longitudinal stripes are broken and the second group of courses appear as a transverse bar in which there are no longitudinal stripes in which the web stands out.

3,992,905

COMPRESSION EXTRACTOR DEVICE FOR LAUNDRY GOODS

Gene Oberley, Westchester, and Richard D. Thompson, Cincinnati, both of Ohio, assignors to McGraw-Edison Company, Elgin, Ill.

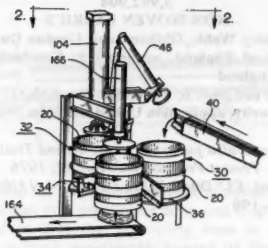
Filed June 30, 1975, Ser. No. 591,757

Int. Cl.² D06F *47/04;* **B30B** *15/02*

U.S. Cl. 68—241 **7 Claims**

1. A compression extractor device for removing excess water from laundered goods, comprising a tub having pervious sides and an open top and an open bottom, means for supporting the tub for movement between and to spaced load, extract, and unload operating stations, means for indexing the tub between and to the respective stations and means for registering and holding the tub at the respective stations, means at the load station including clearance above the open tub top and a base plate underlying and closing the open tub bottom whereby goods can be loaded into the open tub top and be retained therein by the base plate, said base plate extending also in an uninterrupted manner to the extract station to allow

movement of the loaded tub to the extract station while maintaining the tub bottom closed and the goods in the tub, an extractor plunger at the extract station above the open tub top and means for urging the extractor plunger downwardly against the goods in the tub and against the base plate effective for forcing excess water from the goods and out the pervious sides of the tub and onto the base plate, vent means carried by the tub adjacent the tub bottom, means effective with the tub at said extract operating station for discharging air at a high velocity from the vent means and against the base plate for blowing standing water from the base plate, and means at said unload station including clearance below the open tub bottom effective for discharging the extracted goods from the open tub bottom.

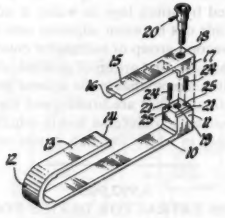


3,992,906

WHEEL LOCK FOR MOTORCYCLES AND THE LIKE

Lewis E. Huddleston, 7110 Denton, Belleville, Mich. 48111

Filed May 15, 1972, Ser. No. 253,626
Int. Cl.² E05B 73/00
U.S. Cl. 70—18 6 Claims



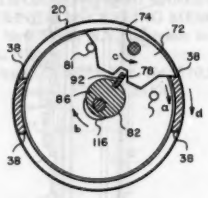
1. In a lock, the combination comprising:
a. a U-shaped shackle member having a long arm and a short arm which is aligned parallel with and laterally spaced apart from said long arm by an integral transverse connecting arm;
b. a releasable locking arm;
c. means for releasably locking said releasable locking arm to said long arm, and in a position parallel to said long arm and in longitudinal alignment with said short arm, including
1. a first lock head fixedly secured to said long arm;
2. a second lock head fixedly secured to said releasable locking arm; and,
3. a cylinder lock means releasably securing said lock heads together to releasably attach said releasable locking arm to said shackle member.

3,992,907

AXIAL PIN TUMBLER LOCK WITH ENGAGEABLE CLUTCH MEMBER

Aksel Pilvet, R.R. No. 2, Warsaw, Ontario, Canada

Filed Mar. 27, 1975, Ser. No. 562,406
Int. Cl.² E05B 13/10, 17/04, 27/02; G05G 5/00
U.S. Cl. 70—222 15 Claims



1. A barrel type lock adapted to be operated by a key and comprising:
housing means having front and rear ends and a hollow interior;
barrel means rotatably mounted for rotation about a predetermined axis within said housing means and adapted to receive said key for rotation thereof;
hub means rotatably mounted at the rear of said housing and being rotatable independantly of said barrel means about the same said axis and adapted for interconnection with any suitable locking means;
abuttment means on said hub means by means of which said hub means may be rotated;
a movable clutch member on said barrel means, movably mounted thereon for movement between abuttment engaging and disengaging positions, said barrel means being rotatable independantly of said hub means when said clutch member is in its disengaging position;
a clutch operating member swingably mounted in said barrel means for swinging between clutch operating and clutch non-operating positions, and interconnecting with said clutch member whereby to hold same in its abuttment disengaging positions, when it is in its clutch non-operating position, and releasing same for movement into its abuttment engaging position when it is in its clutch operating position, and,
a plurality of securing pins slidably mounted in said barrel means interengaging with said clutch operating member and normally securing the same against swinging relative to said barrel means, and being slidably movable along axes parallel to the axis of said barrel means into predetermined positions in response to insertion of said key to thereby free said clutch operating member and permit the same to swing relative to said barrel means aforesaid into its clutch operating position.

11. A clutch assembly for use in association with a barrel type lock having a rotatable barrel, rotation of which is procured and controlled by means of a key insertable therein, and further having a lock operating hub member adapted for connection with a locking member, for moving said locking member into and out of locking position, said barrel member and said hub member being rotatable independently of one another, and said clutch assembly drivably interconnecting said barrel member with said hub member for rotation of said hub member in response to rotation of said barrel member, when said key is inserted into said barrel member, said clutch assembly comprising:
abutment means on said hub member;
a movable clutch member, movably mounted on said barrel member, and swingably thereon between abutment engaging and abutment disengaging positions;
a clutch operating member movably mounted in said barrel means, and engaging said clutch member, said clutch operating member being movable between clutch operat-

ing and clutch non-operating positions, said clutch operating member being movable with respect to said barrel member by swinging about a predetermined axis, and said clutch operating member having a centre of gravity which is offset with respect to said centre axis of rotation, and said clutch operating member, and said clutch member being swingable relative to one another; and

linkage means interconnecting said clutch operating member and said clutch member whereby to restrict the freedom of said independent movement therebetween and transferring movement of said clutch operating member to said clutch member.

3,992,908

DOOR LOCK HOUSING ASSEMBLY AND RELEASABLE CATCH

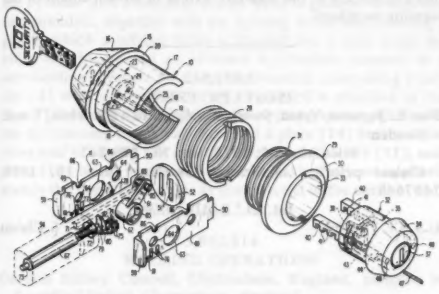
Alois Crepinsek, El Paso, Tex., assignor to International Top Security Corporation, El Paso, Tex.

Continuation-in-part of Ser. No. 531,926, Dec. 12, 1974. This application May 8, 1975, Ser. No. 575,504

The portion of the term of this patent subsequent to Jan. 27, 1993, has been disclaimed.

Int. Cl.² E05B *9/08*

U.S. Cl. 70—370 **7 Claims**



1. A door lock mechanism comprising a lock cylinder housing assembly adapted for mounting in a through bore of a door and including exterior and interior housing sections, means coupling said housing sections in assembled relationship within the confines of the through bore, whereby the coupling means is inaccessible from the exterior and interior sides of the door, a lock bolt assembly mountable within an edge opening of the door in intersecting relation with said through bore, said lock bolt assembly extending across the through bore and interfitting with the lock cylinder assembly within the through bore to resist rotation of the lock cylinder assembly, interengaging catch means on said lock cylinder assembly and lock bolt assembly normally preventing separation of the coupling means, and movable catch releasing means on the lock bolt assembly accessible and operable from the edge of a door carrying said assemblies when such door is open to expose said edge, said coupling means being screw-threaded and rotational, and said interengaging catch means comprising a toothed catch element on the interior housing section, and a coacting normally active shiftable toothed latch element on said door bolt assembly adapted to be de-activated by said movable catch releasing means, said movable catch releasing means comprising a manually operable plunger on the lock bolt assembly having an interior end portion engageable with a release member having a connection with said toothed latch element, and said release member comprising a pivoted release lever on the lock bolt assembly having a part engaging said toothed latch element to withdraw the latter from the toothed catch element, and a spring means on the lock bolt assembly engaging the toothed latch element and urging it toward interlocking engagement with said catch element.

3,992,909

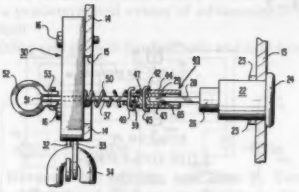
SAFETY RELEASE FOR AUTOMOBILE TRUNK

John S. McGhee, 1106 Hammond Road, Aiken, S.C. 29801

Filed June 24, 1975, Ser. No. 589,915

Int. Cl.² E05B *3/00, 17/04, 65/19;* **E05C** *15/02*

U.S. Cl. 70—379 R **5 Claims**



1. A safety release mechanism for the luggage compartment of an automobile having a lock carried by the compartment closure with a key actuated tumbler assembly mounted in spaced relation to a normally closed latch assembly for releasably securing said closure to said compartment, which release mechanism comprises:

1. A first elongated shaft of non-circular cross section arranged with one end connected to said tumbler assembly for rotation upon tumbler actuation and the other end projecting toward said latch assembly;
2. A second elongated shaft arranged with one end connected to said latch assembly for shiftably releasing the same upon shaft rotation and the other end projecting toward said tumbler assembly in opposing spaced relationship to the projecting end of said first shaft;
3. Clutch means detachably connecting said opposing shaft ends for transmitting axial rotation from said first shaft to said second shaft to shift said latch assembly to its released position upon key actuation of the tumbler assembly, said clutch means comprised of:
   a. An elongated coupling having a radially extending non-circular channel at one end arranged to slideably receive and rotationally engage the projecting end of said first shaft, the entrance to said channel having an inwardly beveled surface arranged to guide and rotationally align said noncircular shaft end upon slideably receiving the same;
   b. A hollow retaining sleeve mounted upon said coupling around the entrance to said channel and extending toward said tumbler assembly around the projecting end of said first shaft, said sleeve having a cylindrical internal surface arranged coextensive with the radial extent of said channel to retain said non-circular shaft in axial alignment while permitting free rotation thereof when clear of said channel; and,
   c. Means for connecting the other end of said coupling to said second shaft for movement therewith, said second shaft being arranged for axial sliding movement from a connected position with the projecting end of said first shaft engaged within said coupling channel to a disconnected position with said first shaft end free of said coupling channel but retained within said sleeve;
4. Spring means arranged to normally bias said second shaft toward the connected position; and,
5. Secondary hand actuated means arranged within the luggage compartment to slide said second shaft against said spring bias into the disconnected position and to rotate the same to shift the latch assembly to its released position for opening said compartment closure independently of said tumbler assembly.

3,992,910
ROLLING OPERATIONS

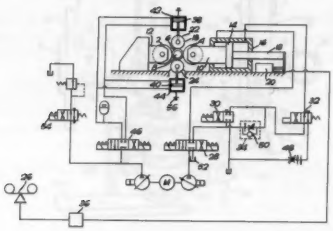
Gordon Sidney Connell, and Ronald Carl Andriessen, both of Cheltenham, England, assignors to Formflo Limited, Cheltenham, England

Filed July 21, 1975, Ser. No. 597,737

Claims priority, application United Kingdom, July 24, 1974, 32784/74

Int. Cl.² B21H *1/12*

U.S. Cl. 72—7 **3 Claims**



1. A method of forming an inner bearing ring, having a required final diameter, from an annular workpiece in a rolling machine having a mandrel for supporting said workpiece, two oppositely disposed forming rolls, one at each side of the mandrel, two oppositely disposed growth control rolls, one at each side of the mandrel and at right angles to said forming rolls, said forming rolls being capable of being advanced relative to one another to a required depth of roll and then retracted relative to one another, the method comprising the steps of:

a. advancing said forming rolls relative to one another until said required depth of roll in said workpiece is reached, whereat a gap between said forming rolls exists,

b. dwelling said forming rolls at said required depth of roll, said

c. retracting said forming rolls relative to one another, initially slowly for a predetermined distance to reduce out of round occurring in said rolled inner bearing ring, and then retracting said forming rolls relative to one another quickly to produce an inner bearing ring having said required final diameter, said predetermined distance over which said forming rolls are retracted slowly depending on the difference between said required final diameter and said gap between said forming rolls after step (a).

3,992,911
DIAMETRAL CONTROL OF ROLLED ANNULAR WORKPIECES BY WEIGHING

Gordon Sidney Connell, and Ronald Carl Andriessen, Cheltenham, both of England, assignors to Formflo Limited, Cheltenham, England

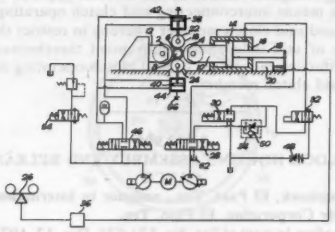
Filed July 21, 1975, Ser. No. 597,739

Claims priority, application United Kingdom, July 24, 1974, 32783/74

Int. Cl.² B21H *1/12*

U.S. Cl. 72—7 **12 Claims**

1. A method of roll forming an annular workpiece to a desired shape from an annular workpiece having dimensions within a tolerance range, in which the variations in the weight of the annular workpiece from a nominally sized workpiece is determined and the workpiece is then roll formed to its desired shape by being squeezed between at least two rotating forming members at least one of which advances relatively towards the other to a fully advanced position to impress the desired shape into the workpiece followed by maintaining the forming members at their fully advanced position to complete the roll forming for a period of time known as the dwell time, and in which extent of advancement of the forming members is varied from the standard required for the nominally sized workpiece in dependence upon the variations in the weight of the cylindrical workpiece from the nominally sized workpiece



so as to produce a final rolled workpiece whose diameter is substantially identical with that of a nominally sized workpiece subjected to the standard extent of advancement of the forming members.

3,992,912
ISOSTATIC PRESS

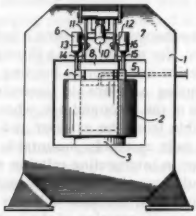
Finn L. Jonsson, Ystad, Sweden, assignor to AB Carbox, Ystad, Sweden

Filed May 20, 1975, Ser. No. 579,247

Claims priority, application Sweden, June 10, 1974, 7407648

Int. Cl.² B21D *26/04*

U.S. Cl. 72—54 **6 Claims**



1. An isostatic press comprising:

a pressure vessel for receiving therein a workpiece;

means for filling said pressure vessel with a pressure fluid and for pressurizing same;

a vertically movable lid for sealingly closing said pressure vessel;

a frame for receiving said pressure vessel and lid and including means for absorbing substantially vertically directed forces;

means coupled to said frame and to at least one of said lid and pressure vessel for producing a relative movement substantially vertically between said lid and said pressure vessel after the pressure vessel has been received in said frame; and

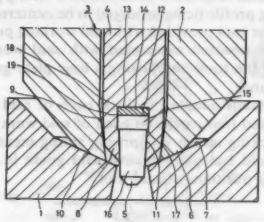
at least one laterally displaceable spacer element which is located between said lid and said frame before said pressure fluid in said pressure vessel is pressurized.

3,992,913

PRESS FOR HYDROSTATIC EXTRUSION OF TUBES

Jan Nilsson, Robertsfors, Sweden, assignor to Allmanna Svenska Elektriska Aktiebolaget, Vasteras, Sweden

Filed May 22, 1975, Ser. No. 580,462
Claims priority, application Sweden, June 7, 1974, 7407508
Int. Cl.² B21C 25/04
U.S. Cl. 72—60 4 Claims



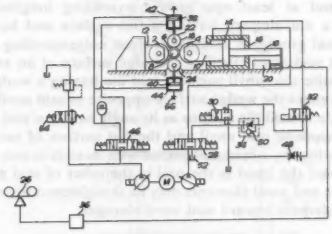
1. Press for hydrostatic extrusion of tubes with a pressure chamber comprising a high pressure cylinder, a pressure generating punch insertable into the cylinder, a die arranged in the cylinder and a mandrel axially fixed in relation to said die, said mandrel, together with an opening in the die, forming a gap in which a tubular billet is shaped into a tube when the billet is subjected to an all-sided hydrostatic pressure in a surrounding pressure medium, the mandrel comprising a carrier (4) with a bore (11), a tip (5) which is attached in the bore (11) and projects into the die opening and together with the die opening forms said gap, and a plate (14) between the inner end of the tip (5) and the bottom of the bore (11), said plate (14) being made of a material having at least approximately the same E-modulus as the material of the carrier (4).

3,992,914

ROLLING OPERATIONS

Gordon Sidney Connell, Cheltenham, England, assignor to Formflo Limited, Cheltenham, England

Filed July 21, 1975, Ser. No. 597,738
Claims priority, application United Kingdom, July 24, 1974, 32785/74
Int. Cl.² B21H 1/12
U.S. Cl. 72—106 2 Claims



1. A method of roll forming an inner bearing ring from an annular workpiece in a rolling machine having a mandrel for supporting said workpiece, two oppositely disposed forming rolls, one on each side of the mandrel, two oppositely disposed growth control rolls, one on each side of the mandrel, at right angles to said forming rolls, said forming rolls being capable of advancing relative to one another to roll form said workpiece and retracting, said growth control rolls being capable of advancing towards one another and retracting, said method comprising the steps of:

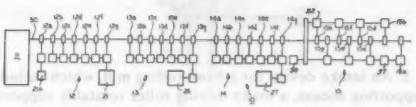
a. advancing the forming rolls relative to one another until a predetermined depth of roll is reached,
b. advancing said growth control rolls towards one another, said growth control rolls contacting said workpiece and exerting a relatively low force on said workpiece until said forming rolls reach said predetermined depth of roll,
c. thereafter increasing the force exerted by said growth control rolls on said workpiece and allowing said growth control rolls to advance towards each other under said increased force to diametrically shrink said workpiece until a predetermined extent of advancement is reached, and then
d. retracting said growth control rolls and said forming rolls.

3,992,915

ROLLING MILL

Robert J. Hermes, Wyomissing, and John F. Turner, West Lawn, both of Pa., assignors to Birdsboro Corporation, Birdsboro, Pa.

Filed Apr. 21, 1975, Ser. No. 569,767
Int. Cl.² B21B 35/02
U.S. Cl. 72—234 13 Claims



1. A rolling mill having a plurality of groups of serially arranged roll stands, each roll stand havin rolls through which a metal strand passes for cross-sectional reduction and elongation, passage of said strand through successive roll stands successively elongating and reducing said strand, drive means for rotating said rolls, a terminal group of said roll stands comprise a finishing group,

said drive means including a common drive assembly for at least the first and second roll stands of said terminal group, one of said first and second roll stands being coupling to said common drive assembly,

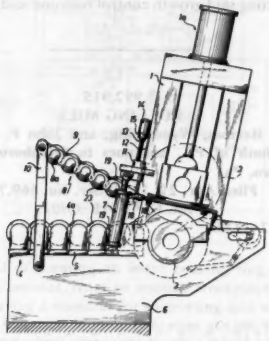
and differential means coupling the other of said first and second roll stands to said drive assembly, said differential means being operative for rotating the rolls of one of said first and second roll stands at a predetermined speed relative to the speed at which the rolls of the other of said first and second roll stands is rotated by said common drive assembly so that said finishing group may produce a final product having a first predetermined cross-sectional area upon receipt of a strand having a second predetermined cross-sectional area from the preceeding group of roll stands in said serial arrangement.

said differential means including adjustment means for adjusting the speed relation of the rolls of said first and second roll stands so that said finishing group may produce a final product having a third predetermined cross-sectional area upon receipt of a strand from said preceding group having said second predetermined cross-sectional area whereby the cross-sectional area of said finished product may be varied without adjusting the roll stands of said preceding group.

3,992,916
INTAKE DEVICE FOR A BAND ROLLING MILL

Wolfgang Fabian, Dortmund-Hombruch; Konrad Klein, Dortmund-Wambel; Theodor Sevenich, and Hans Wladika, both of Dortmund, all of Germany, assignors to Hoesch Werke Aktiengesellschaft, Dortmund, Germany

Filed Oct. 1, 1975, Ser. No. 618,501
Claims priority, application Germany, Oct. 16, 1974, 2449199
Int. Cl.² B21B 39/12
U.S. Cl. 72—251 7 Claims

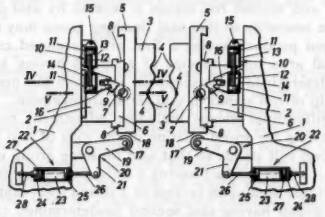


1. An intake device for a band rolling mill, which includes: supporting means, a lower driving roller rotatably supported by said supporting means, a stand supported by: said supporting means, an upper driving roller supported by said stand and adjustable relative to said lower driving roller to form a bite therewith, a lower roller bed supported by said supporting means, and comprising a plurality of rollers arranged one behind the other and ahead of said lower driving roller when viewing the intended direction of movement of a band to be rolled into said bite, an upper roller bed having a plurality of rollers arranged one behind the other for cooperation with the rollers of said lower roller bed, said upper roller bed being arranged above said lower roller bed and having one end pivotally connected to said frame and having its other end movably supported by said stand and adjustable selectively toward and away from the adjacent end of said first roller bed for varying the angle between said first and second roller beds.

3,992,917
FORGING MACHINE

Bruno Kralowetz, St. Ulrich 142, Steyr, Austria

Filed Sept. 18, 1975, Ser. No. 614,505
Claims priority, application Austria, Oct. 9, 1974, 8098/74
Int. Cl.² B21J 13/02
U.S. Cl. 72—407 12 Claims



1. A forging machine which comprises

a machine housing,

two tool carriers mounted in said machine housing and guided on an axis and adapted to act oppositely on each other, said tool carriers having confronting ends,

a guide carried by each of the tool carriers,

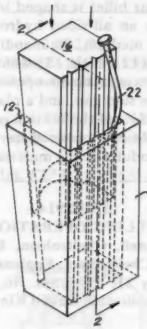
two forging tools, each of which has a plurality of working profiles and is mounted on one of said tool carriers and shiftable thereon to a plurality of working positions associated with respective ones of said working profiles, each working profile being arranged to be centered on said axis when the tool provided with said working profile is in the working position associated with said working profile, each of the tools comprising a base plate guided on said guide, and

locking means adapted to lock each of said tools on the associated tool carrier in each of said working positions, said locking means comprising spring means adapted to force said baseplate against said guide in each of said working positions of said tool.

3,992,918
NAIL STRAIGHTENER

David R. Broyles, 1032 Ohio, Lawrence, Kans. 66044

Filed Oct. 15, 1975, Ser. No. 622,504
Int. Cl.² B21D 3/10
U.S. Cl. 72—416 3 Claims



1. A nail straightener comprising a fixed anvil having a flat surface and at least one groove extending longitudinally thereon, a die element having a flat surface and having a longitudinal groove in said die surface corresponding to the groove in said anvil element, a wedge surface at an angle to and opposite said anvil surface, said die having a wedge surface to contact the wedge surface opposite to said anvil at the same angle to said die surface as its angle between said wedge surface opposite said anvil and the flat surface of said anvil element whereby a bent nail placed with its ends in one of said grooves and the bend in the nail in the other of said grooves in said die and anvil elements may be straightened by wedging said die element toward said anvil element.

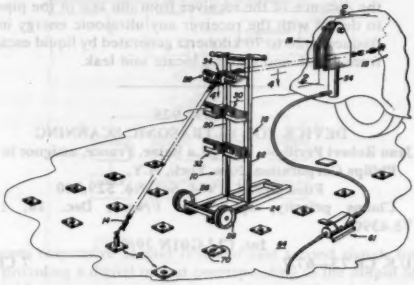
3,992,919
SHEET METAL PULLING POWER HEAD AND STAND

Davis R. Jarman, Brunswick, Ga., assignor to Virgil Hinson, Brunswick, Ga., a part interest

Filed Sept. 9, 1974, Ser. No. 504,114
Int. Cl.² B21D 1/12
U.S. Cl. 72—447 8 Claims

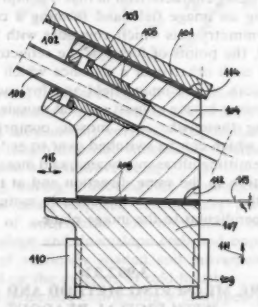
1. A pulling apparatus, comprising, in combination: (a) a rigid stand including a vertically upstanding frame forming a tower, a base supporting the frame, and at least one hanger mounted on the frame;

b. an anchor;
c. a flexible member for being connected to a structure to be straightened and to the anchor; and
d. a power head; wherein
e. in a first arrangement of the elements, the power head is arrangeable on the hanger of the stand for guiding the flexible member, the power head being arrangeable swingingly suspended on the hanger and supporting the



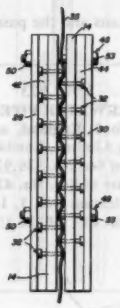
flexible member on the stand to form the first arrangement of the elements, and a second arrangement of the elements wherein the power head is supportable by the flexible member and additionally cooperates with the stand, anchor, and flexible member, with the second arrangement of the elements including a pulley arrangeable on the hanger of the stand and guidingly supporting the flexible member the power head being arranged engaging the flexible member to tighten the same.

3,992,920
WEDGE PRESS
Horst Bachmann, Rodental, Germany, assignor to Langenstein & Schemann Aktiengesellschaft, Coburg, Germany
Continuation of Ser. No. 476,590, June 5, 1974, abandoned. This application Dec. 11, 1975, Ser. No. 639,887
Claims priority, application Germany, June 8, 1973, 2329323; June 8, 1973, 2329324
Int. Cl.² B21J 9/18
U.S. Cl. 72—452 **4 Claims**



1. A wedge press comprising: a press frame member; a reciprocatingly displaceable ram member; a reciprocatingly displaceable wedge member for acting on the ram member; and means for effecting displacement of the wedge member to cause the wedge to act upon the ram member and thereby to effect displacement of the ram member, the wedge member and the press frame member having a pair of mutually contact contact surfaces and the wedge member and the ram member having a pair of mutually engaging contact surfaces, at least one of said pair of mutually engaging contact surfaces having a protruding portion on one member and a recess portion in the other member shaped to provide non-linear contact and improved guiding of the wedge member, the recess portion being defined by at least one trough-like depression, and the depression extending across the entire width of the wedge member.

3,992,921
BODY SILL CLAMP
Davis R. Jarman, Brunswick, Ga., assignor to Virgil Hinson, Brunswick, Ga., a part interest
Filed July 16, 1975, Ser. No. 596,369
Int. Cl.² B21D 1/12
U.S. Cl. 72—457 **9 Claims**

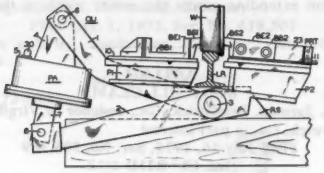


1. A body sill clamp, comprising, in combination:
a. first and second plates provided with connecting means for attachment to a pulling device, the plates disposed in substantially parallel, adjacent relation;
b. clamp means arranged embracing the first and second plates for selectively drawing the plates together; and
c. projecting means including a plurality of teeth, each of the plates having at least one of the teeth mounted thereon, for penetrating metal arranged between the plates, the teeth of each of the plates being offset from one another, the first and second plates being each provided with an aperture, and the projecting means including a tooth removably disposed in the aperture, with the tooth mounted on one of the plates being arranged pointing toward, but offset from, the tooth mounted on the other of the plates, each tooth being arranged along a plane parallel with the plane of the other tooth; the teeth each including a shank having an end portion of and a head attached to the shank at a point of the shank spaced from the end portion, the clamp means including first and second jaws, each of the jaws comprising an elongated element provided with a ledge forming a lip and arranged for receiving the head of the tooth disposed in the aperture of one of the plates disposed adjacent and abuting the respective jaw and retaining the tooth in the plate, the lip forming an abutment for the head of the tooth.

3,992,922
COEFFICIENT OF FRICTIONAL DETERMINING APPARATUS FOR RAILWAY VEHICLES
Peter M. Noble, Valencia, Pa., assignor to Westinghouse Air Brake Company, Swissvale, Pa.
Filed Oct. 14, 1975, Ser. No. 621,944
Int. Cl.² G01N 19/02
U.S. Cl. 73—9 **12 Claims**

1. A coefficient of friction determining arrangement comprising, means for frictionally engaging the sides of passing wheels of railway vehicles and for developing a force in at

least one direction, and means responsive to said force for determining the coefficient of friction existing between said



frictional engaging means and the passing wheels of the railway vehicles.

3,992,923

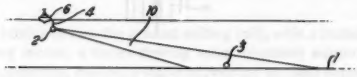
UNDERWATER PIPELINES

Arthur Roberts, Ashford, England, assignor to The British Petroleum Company Limited, London, England

Continuation-in-part of Ser. No. 539,920, Jan. 9, 1975, which is a continuation-in-part of Ser. No. 420,002, Nov. 29, 1974, abandoned. This application Dec. 1, 1975, Ser. No. 636,605

Int. Cl.² G01M *3/24*

U.S. Cl. 73—40.5 A **7 Claims**



1. A method of testing an underwater pipeline carrying gas at a greater than ambient pressure to detect whether a leak is present and to locate said leak which method comprises:

a. moving a transmitter and receiver of ultrasonic pulses externally of the pipeline along a path at a distance of up to 5,000 feet (measured in a horizontal plane) from the axis of the pipeline

b. transmitting ultrasonic pulses of frequency in the range 20 to 250 kilohertz at a rate of 0.1 to 10 pulses per second in a beam having a beam width in the horizontal plane of ½ to 10°

c. correlating the rate at which pulses are emitted from the transmitter with the speed of movement of the transmitter and receiver, the horizontal beam width and distance of the transmitter and receiver from the axis of the pipeline to detect with the receiver, the pulses reflected by gas bubbles escaping from a leak and thereby detect and locate said leak.

3,992,924

UNDERWATER PIPELINES

John William Ells, Bexleyheath, and Arthur Roberts, Ashford, both of England, assignors to The British Petroleum Company Limited, London, England

Continuation-in-part of Ser. No. 539,921, Jan. 19, 1975, which is a continuation-in-part of Ser. No. 420,003, Nov. 29, 1973, abandoned. This application Dec. 1, 1975, Ser. No. 636,654

Int. Cl.² G01M *3/24*

U.S. Cl. 73—40.5 A **4 Claims**

1. A method of testing an underwater pipeline carrying liquid in a greater than ambient pressure to detect whether a leak is present and to locate said leak comprising:

a. moving a directional receiver capable of detecting ultrasonic energy within an arc of 10° measured in a horizontal plane and sensitive to frequencies in the range 20 to 70 kilohertz externally of the pipeline along a path up to 5,000 feet from the axis of the pipeline (measured in a horizontal plane), and

b. correlating the speed of movement of the receiver, and the distance of the receiver from the axis of the pipeline to detect with the receiver any ultrasonic energy in the frequency 20 to 70 kilohertz generated by liquid escaping from a leak and thereby locate said leak.

3,992,925

DEVICE FOR ULTRASONIC SCANNING

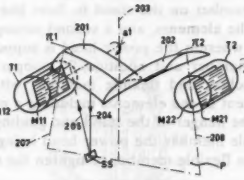
Jean Robert Perilhou, Bourg La Reine, France, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Dec. 4, 1974, Ser. No. 529,360

Claims priority, application France, Dec. 10, 1973, 73.43904

Int. Cl.² G01N *29/04*

U.S. Cl. 73—67.7 **7 Claims**



1. A device for ultrasonic scanning, comprising a reflector having a parabolic surface which intersects each plane perpendicular to an image plane according to a curved line which is symmetrical with respect to the image plane, said reflector serving to reflect ultrasonic beams which are emitted from the point of focus of the reflector by at least one emitter/receiver composed of discrete elements, and means for rotating the emitter/receiver about an axis which extends through the point of focus and which is perpendicular to the image plane, said device being characterized in that it comprises two reflectors defining an image field and forming a continuous line having a symmetry axis which coincides with the axis of the image field, the points of focus of the reflectors being separated from each other over a distance which amounts to at least the width of the image field and for each reflector an emitter/receiver having at least one flat mosaic of transducers co-operating therewith, each mosaic comprising a central transducer which can be switched over so as to function as a source for emitting ultrasonic beams, said mosaics being capable of rotation in the same direction and at the same speed such that the mosaics are continuously mutually parallel in planes perpendicular to the image plane.

3,992,926

PRESSURE MEASURING METHOD AND APPARATUS WITH DIGITAL READOUT

Robert C. Berryhill, Redding, Calif., assignor to Ber-Tek, Inc., Redding, Calif.

Filed July 28, 1975, Ser. No. 599,925

Int. Cl.² A61B *3/16*

U.S. Cl. 73—80 **6 Claims**

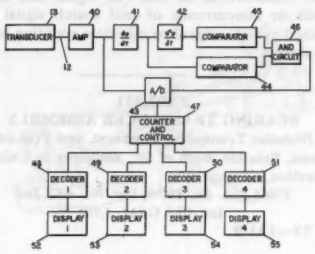
1. A pressure measuring apparatus comprising:

means responsive to a variable pressure for providing an output signal proportional to said pressure; and

means responsive to a predetermined change in said output signal for indicating the magnitude of said pressure at the

time of said predetermined change, said indicating means comprising:

means responsive to said output signal for outputting a first and a second signal proportional, respectively, to the first and second derivatives of said output signal;



means responsive to said first and said second signals for providing a digital output corresponding to the output of said pressure-responsive means when said first derivative has a predetermined polarity and said second derivative exceeds a predetermined magnitude;

means for storing said digital output; and

means coupled to said storing means for visually displaying the magnitude of said digital output.

3,992,927

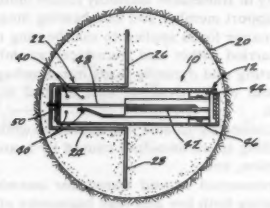
SOIL MOVEMENT DETECTION APPARATUS

Frederick R. Troeh, Ames, Iowa, assignor to Iowa State University Research Foundation, Inc., Ames, Iowa

Filed Aug. 11, 1975, Ser. No. 603,600

Int. Cl.² G01N *33/22*

U.S. Cl. 73—88 E **4 Claims**



1. An apparatus for detecting soil movement, comprising,

an elongated housing for insertion downwardly into the soil and being substantially vertically disposed, said housing having its length disposed substantially perpendicular to the direction of soil movement,

said housing having a rectangular cross-section with its major axis being disposed substantially parallel to the direction of anticipated soil movement, said housing having upslope and downslope ends and opposite sides,

a plurality of vertically spaced soil movement detectors positioned on the exterior of said housing,

each of said detectors comprising a U-shaped portion embracing a portion of each side of said housing and said downslope end of said housing, each of said detectors having a pair of flat laterally extending portions extending outwardly from said U-shaped portion and being disposed substantially transverse to the direction of anticipated soil movement, each of said flat laterally extending portions dwelling in a substantially vertical plane,

a plurality of indicators at the upper end of said housing, and

mechanical linkage means connecting each of said soil movement detectors to one of said indicators whereby movement of the detector relative to the said housing will be indicated.

3,992,928

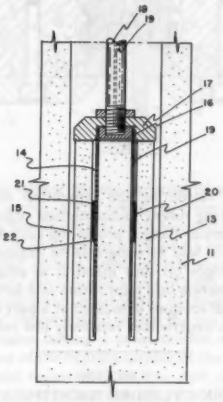
MEASURING THE STRENGTH OF A ROCK FORMATION IN SITU

Robert L. Thoms, 7625 N. Coventry Circle, Baton Rouge, La. 70808

Filed Nov. 28, 1975, Ser. No. 635,807

Int. Cl.² G01N *3/10*

U.S. Cl. 73—88 E **5 Claims**



1. A process for measuring the strength of a rock formation in situ, which process comprises:

a. cutting two concentric annular cavities in the rock formation to form a hollow cylinder of rock which remains connected to the rock formation at one end and is supported thereby;

b. inserting into the inner annular cavity a cylindrical support having an expandable collar secured to its outer surface and positioned perpendicularly to its longitudinal axis, the expandable collar communicating with means for the supply thereto of a fluid under pressure;

c. applying end pressure to the hollow cylinder of rock and pressurizing the expandable collar with fluid so the collar expands against the hollow cylinder of rock surrounding it and causes the hollow cylinder of rock to fracture; and

d. monitoring the fluid pressure as the collar is pressurized and the hollow cylinder of rock is caused to fracture, and recording the highest value of the pressure as a measure of the tensile strength of the rock.

3,992,929

SPLIT MANDREL

Gordon Sidney Connell, Cheltenham, England, assignor to Formflo Limited, Cheltenham, England

Filed July 21, 1975, Ser. No. 597,740

Claims priority, application United Kingdom, July 24, 1974, 32786/74

Int. Cl.² B21H *1/12*

U.S. Cl. 72—106 **6 Claims**

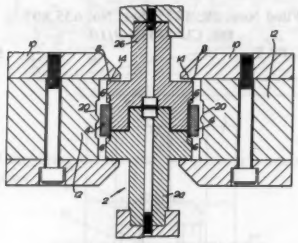
1. A rolling machine for roll forming inner and outer profiles of a workpiece, which machine comprises:

a. a mandrel for supporting said workpiece during rolling and having a forming surface for shaping the inner profile of said workpiece, said mandrel having two separate sections which can be separated during rolling to define said forming surface with a portion of said forming surface on each of said sections and which can be separated

at a joint within said forming surface after rolling the workpiece to release the formed workpiece,

b. two oppositely disposed forming rolls having formed in the periphery thereof a second forming surface shaped to conform to the rolled outer profile of said workpiece,

c. means for advancing said forming rolls towards one another to roll form a workpiece,



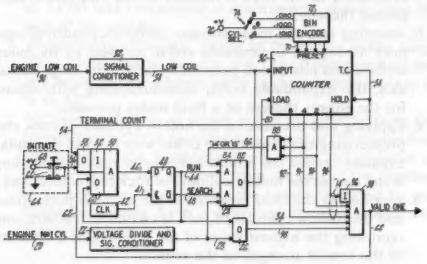
d. means for restricting the separation of said mandrel sections during rolling including side edges on said mandrel and annular flanges projecting radially outwardly at either side of said forming rolls to engage and embrace said side edges on said mandrel as said forming rolls advance, wherein said joint within said forming surface of said mandrel sections is located at a part of said forming surface that experiences relatively low rolling forces.

3,992,930

ENGINE CYLINDER IDENTIFICATION

Paul Roger Back, Somersville; Robert James Fraleigh, Vernon, and Rocco Vincent Aibano, Cromwell, all of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Dec. 8, 1975, Ser. No. 638,880
Int. Cl.² F02P *17/00*
U.S. Cl. 73—117.3 **9 Claims**



1. Apparatus for generating a signal coincident with the firing of a selected cylinder in an electric ignition internal combustion engine having *n* cylinders, comprising:

bistable means settable into either one of two stable states and generating a run signal when in one stable state and generating a search signal when in the other stable state;

counter means adapted for connection to the low side of the coil of the engine for counting engine low coil signals and for providing count signals indicating said counter has counted n low coil signals;

means adapted for connection to the high voltage ignition wire of a selected cylinder of the engine for generating a selected cylinder signal;

means responsive to said search signal and to said selected cylinder signal for causing said counter to initiate a count of said low coil signals;

output means connected for response to the output of said counter means, said low coil signals, and said ignition signal and operative in response to concurrence of said count signals, a low coil signal and said selected cylinder signal or said run signal for generating a valid one signal; and

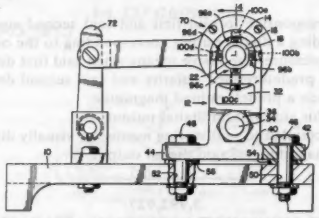
load means connected for response to said counter means and to said bistable means and operative in response to either concurrence of said run signal and said count signals or concurrence of said search signal and said selected cylinder signal to reinitiate counting of said low coil signals.

3,992,931

BEARING TRANSDUCER ASSEMBLY

Michael Nicholas Tranquilla, Elmhurst, and Prakash Dhirubhai Desai, Palatine, both of Ill., assignors to Union Special Corporation, Chicago, Ill.

Filed Jan. 26, 1976, Ser. No. 652,266
Int. Cl.² G01L *5/00*
U.S. Cl. 73—133 R **13 Claims**



1. An apparatus for measuring dynamic load applied to a bearing means by a dynamic load generating means, said apparatus comprising:

a support member;

a plurality of transducer assembly means mounted between said support member and said bearing means for detecting dynamic loads applied to said bearing means;

means carried within said transducer assembly means for converting said dynamic loads into a voltage that is proportional to the dynamic load applied to said bearing means;

means connected to said transducer assembly means for cancelling spurious output caused by bearing means deformation; and

means connected to said transducer assembly means for measuring both low and high harmonics of said voltage.

3,992,932

TORQUE MEASURING SYSTEM

Harry J. Venema, Wheaton, Ill., assignor to Borg-Warner Corporation, Chicago, Ill.

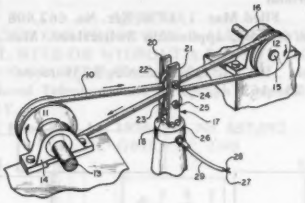
Filed Oct. 24, 1974, Ser. No. 517,689
Int. Cl.² G01L *5/04*
U.S. Cl. 73—136 R **6 Claims**

1. A measuring system for use with a power transmission system in which power is transferred from a driving member to the driven member by a continuous power transmission strand, which strand has a tensioned side and a slack side during power transmission, which measuring system comprises:

a support member, having a base and a pair of legs extending at substantially right angles to the base, each of said legs defining a pair of spaced-apart openings;

a pair of idler rollers, each having a support shaft extending into one of the openings in each of the support member legs, each idler roller supported to bear against the continuous strand and pinch together said tensioned and slack sides, such that displacement of the strand subjects the idler rollers to oppositely directed forces proportional

to the respective tensions in said tensioned and slack sides and develops a differential force in each of the support member legs; and



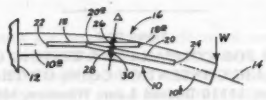
measuring means, coupled to the support member for subjection to the resultant of said oppositely directed forces, for providing a torque-indicating signal which varies as a function of the differential force developed.

3,992,933

ELECTROMECHANICAL MOMENT-INDEPENDENT DEFLECTION SENSOR

George J. Randolph, Jr., 803 SE. Kane, Roseburg, Oreg. 97470

Filed Aug. 21, 1975, Ser. No. 606,765
Int. Cl.² G01L *5/00*
U.S. Cl. 73—141 A **6 Claims**



1. Apparatus for measuring the load applied in a selected plane to a cantilever-type beam, without regard to the exact point of load application to the beam, said apparatus comprising

a pair of tangent devices, including an inner and an outer device, adapted to be mounted at spaced-apart points on the beam in said selected plane between the beam's inner fixed end and outer free end, said outer device being intended for positioning no further outwardly on the beam than the innermost point thereon contemplated for possible load application,

each tangent device including an elongated part which, with the device in place on the beam, and under all conditions of bending of the beam in said selected plane, tend to extend in said plane parallel to a line which is tangent to the longitudinal axis of the beam at the point where the device is mounted, each of said elongated parts including a marker portion which is adjacent the marker portion in the other part, and

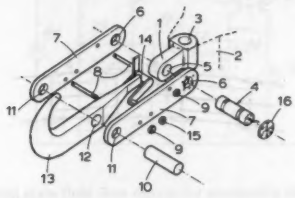
means cooperating with said devices for enabling monitoring of the tendency for the spacing, as measured in said plane, to change between said marker portions.

3,992,934

MOORING DEVICE

John Campbell Clark, Newport, United Kingdom, assignor to Strainstall Limited, Cowes, Great Britain

Filed Apr. 21, 1975, Ser. No. 566,951
Claims priority, application United Kingdom, Apr. 26, 1974, 18392/74
Int. Cl.² G01L *5/10*
U.S. Cl. 73—143 **8 Claims**



1. A mooring device for the mooring of a vessel movable relative to the device, a line extending from the vessel to the device whereby the line moves in response to the vessel movements, said device comprising a stationary base section and a relatively pivotal section, said pivotal section comprising means for holding the line and a pair of arms, a pin extending between said arms which is subjected to shear stress when the device is in use, characterized in that the pin is provided with at least one region having a cross section with a diameter smaller than that of the bearing surface of the pin, there being mounted on said region at least one pair of strain sensors adapted to be connected into an electrical circuit capable of indicating shear strain due to force applied to the pin, said smaller diameter being such as to avoid direct compressive stresses being communicated to said region by parts of the device bearing on the pin without weakening it to an extent incompatible with its use in a mooring device, and means constraining said pin against pivoting movement relative to said pivotal section to which a mooring load is attached, said constraining means tying said pin to said arms whereby movement of the arms in response to changes in the direction of force applied by the vessel to the line results in corresponding movement of the pin, the plane of action of the strain sensors being thereby maintained substantially in alignment with the direction of any resultant applied force which produces said shear strain.

3,992,935

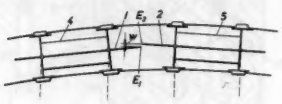
METHOD AND APPARATUS FOR INDICATING TRACK CONDITIONS

Egon Schubert, Vienna, Austria, assignor to Franz Plasser Bahnbaumaschinen-Industrie-Gesellschaft m.b.H., Vienna, Austria

Continuation of Ser. No. 362,319, May 21, 1973, abandoned, which is a continuation of Ser. No. 152,265, June 11, 1971, abandoned, which is a division of Ser. No. 822,966, May 8, 1969, Pat. No. 3,638,482. This application Nov. 29, 1974, Ser. No. 528,033
Claims priority, application Austria, June 25, 1968, 6104/68
Int. Cl.² G01M *17/02*
U.S. Cl. 73—146 **9 Claims**

1. An apparatus for indicating the condition of a railway track section, comprising two associated and cooperating measuring bogies closely spaced along the track section in a tandem arrangement, each measuring bogie being mounted on the track section on at least two axles and responsive to the condition of the track section independently of the other measuring bogie, an element extending from each one of the bogies in the direction of the track section elongation, the elements extending towards each other, each of the elements

carrying a measuring part, the measuring parts being constituted essentially by two carrying plates of substantially the same size being mounted on the bogies for movement therewith in a direction perpendicular to the axis of the track section in response to a corresponding movement by a respective one of the bogies caused by the condition of the track section during their movement along and over the track section, the two plates extending substantially perpendicularly to the track



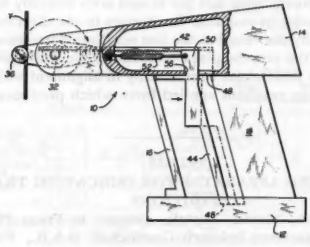
section axis and having glidingly contacting surfaces an electrically insulating film on each of the surfaces, radially extending windings carried by each of the plates, an alternating current source in circuit with the windings on one of the plates, whereby the moving plates cooperate to produce signals indicating the relative position of the moving bogies, means for recording the signals, and the windings on the other plate being in circuit with the recording means.

3,992,936

YARN MEASURING INSTRUMENT

Robert W. Clemens, Malverne, N.Y., and Edward W. Schussel, King of Prussia, Pa., assignors to Wesco Industries Corporation, Plainview, N.Y.

Filed June 23, 1975, Ser. No. 589,622
Int. Cl.² G01L 5/04
U.S. Cl. 73—160 **10 Claims**



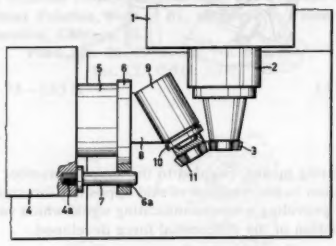
1. In a yarn measuring instrument having a rotatably mounted operative element whose rotation in response to frictional engagement thereof by travelling yarn cooperates with electronic circuit means to measure a plurality of characteristics of said travelling yarn, means for capturing said travelling yarn and placing said captured travelling yarn in frictional engagement with said operative element comprising, an arm having a free end provided with yarn retaining guide means, said arm being mounted within said instrument for movement between a projected position thereof in which said yarn retaining guide means extends outwardly of said instrument and a retracted position thereof in which said yarn retaining guide means extends inwardly of said instrument, whereby travelling yarn captured in said retaining guide means when said arm is in said projected position thereof automatically frictionally engages and drives said operative element when said arm is moved to said retracted position thereof.

3,992,937

APPARATUS FOR LAPPING AND TESTING TWO MESHING GEARS WHOSE AXES ENCLOSE A RANDOM ANGLE WITH ONE ANOTHER

Hans Jaeger, Volketswil; Erich Kotthaus, Wallisellen, and Ulrich Raess, Regensdorf, all of Switzerland, assignors to Werkzeugmaschinenfabrik Oerlikon-Buhrle AG, Zurich, Switzerland

Filed Mar. 1, 1976, Ser. No. 662,808
Claims priority, application Switzerland, Mar. 24, 1975, 3773/75
Int. Cl.² G01M 13/02; B23F 19/04
U.S. Cl. 73—162 **7 Claims**



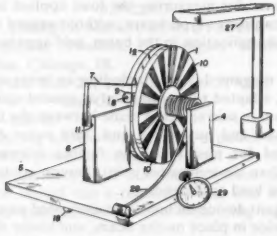
1. An apparatus for lapping and testing two gears meshing with one another and the axes of which enclose a random angle with respect to one another, comprising a lapping- and testing machine for gears, the axes of which gears are disposed at essentially right angles to one another, said lapping and testing machine including two headstocks and a respective work spindle rotatably mounted in each said headstock, an auxiliary device including means for securing the auxiliary device at one of both work spindles, said auxiliary device comprising a third work spindle which is inclined through a predetermined angle relative to both of the other work spindles.

3,992,938

DEVICE FOR COMPARATIVE TESTING OF THE METALLIC CONTENT OF COINS OR THE LIKE

Leo C. Miller, 11110 Dodson Lane, Wheaton, Md. 20902

Filed Nov. 20, 1975, Ser. No. 633,906
Int. Cl.² G07F 3/02
U.S. Cl. 73—163 **15 Claims**



1. Apparatus for testing the metallic content of a coin or the like comprising:

magnetic means for generating a magnetic field in an air gap,

means connected to move said magnetic means for moving said magnetic field relative to said coin or the like along a predetermined path,

means for holding said coin or the like stationary with respect to said predetermined path to cause said coin or the like to traverse said air gap, and

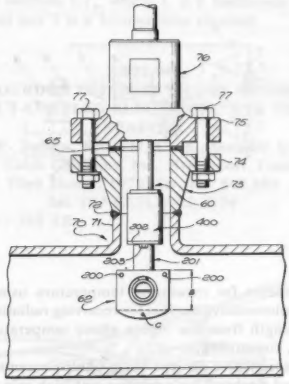
means for measuring the deceleration effect on said magnetic means during movement of said magnetic field relative to said coin or the like.

3,992,939

APPARATUS FOR PRODUCING A MASS FLOW RATE SIGNAL WITH OR WITHOUT A DENSITY SIGNAL

Milton H. November, Hacienda Heights, Calif., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Feb. 11, 1976, Ser. No. 657,092
Int. Cl.² G01F *1/32, 1/86*
U.S. Cl. 73—194 M **13 Claims**



1. Apparatus for producing an electrical output directly proportional to mass flow rate, said apparatus comprising: a vibration densitometer including a probe having a vibrating element, a loop circuit, and a function generator, said loop circuit having an input connected from an output of said probe and a first output connected to an input of said probe, said loop circuit having a second output connected to said function generator, said function generator producing an output directly proportional to the density of a fluid in which said vibrating element is immersed; an apertured shield fixed around and relative to said probe in spaced relation thereto, said shield having a shape to cause vortex shedding in the vicinity of said vibrating element when the same is immersed in a flowing fluid, said probe and said loop circuit forming an electromechanical oscillator tuned to the resonant frequency of said vibrating element, said probe causing an amplitude modulated carrier signal to be produced at the output thereof, said loop circuit producing substantially constant amplitude output signals at its outputs directly proportional to said carrier frequency, said carrier frequency being directly proportional to said flow rate resonant frequency; and utilization means connected from said output of said probe, said second output of said loop circuit, and said function generator output for producing an output directly proportional to the mass flow rate m around said vibrating element where

$$m = Kf_v(AT^2 - B)$$

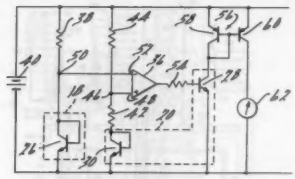
f_v is the frequency of the envelope of said carrier,
T is the reciprocal of the carrier frequency, and
K, A and B are constants.

3,992,940

SOLID STATE FLUID FLOW SENSOR

George E. Platzer, Jr., Southfield, Mich., assignor to Chrysler Corporation, Highland Park, Mich.

Filed Nov. 2, 1973, Ser. No. 412,216
Int. Cl.² G01F *1/68*
U.S. Cl. 73—204 **7 Claims**



1. A solid state fluid flow sensor for measuring the mass flow of a fluid through a conduit, said sensor comprising:

a thin film insulative supporting member in the conduit;

a first integrated circuit chip mounted on said member, said first chip having a first diode-connected transistor temperature sensing means integral therewith for monitoring the ambient temperature of the fluid flowing past the first circuit chip and generating an electrical signal proportional to said fluid ambient temperature;

a second integrated circuit chip located adjacent said first chip on said member, said second chip having a second diode-connected transistor temperature sensing means and a transistor heating means integral therewith for heating the second chip, said second temperature sensing means generating a second electrical signal proportional to the temperature to which said second chip is heated;

circuit means connected to said first and second chips supplying an amount of current to said transistor heating means for heating and maintaining said second chip at a predetermined constant temperature difference from said first chip above the ambient fluid temperature in response to the voltage drop across said first and second temperature sensing means; and

indicating means responsive to the amount of current supplied to said transistor heating means to indicate the mass fluid flow through the conduit, said current varying in proportion to changes in the mass fluid flow.

3,992,941

LIQUID LEVEL MEASURING APPARATUS

Daniel J. McGoldrick, 28 Garrison Road, Hingham, Mass. 02043

Filed June 10, 1974, Ser. No. 477,801
Int. Cl.² G01F *23/06*; G01B *21/00*
U.S. Cl. 73—313 **22 Claims**

1. Apparatus for determining the level of liquid in a container which contains a liquid and a non-liquid medium at high pressure comprising,

means for enclosing a portion of the liquid at the liquid level in a substantially vertical volumn partially open at both ends,

the enclosed liquid being substantially entrapped in the lower portion of the column with a non-liquid medium extending upward from the liquid surface in the column,

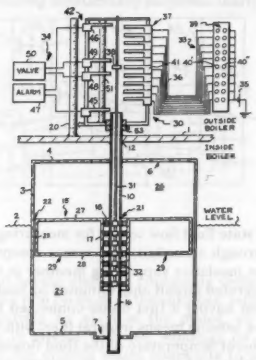
a plunger in the column providing a bottom plunger surface generally parallel to and juxtaposed to the liquid surface, the edge of said bottom plunger surface fitting slideably in the enclosing means so as to restrict substantially fluid flow in the column past the plunger,

the plunger being adapted to descent in the column through the non-liquid medium toward the liquid medium,

the plunger being at least partially open at the bottom so as to entrap vapor within the plunger, whereby the plunger descends until the weight of the plunger is bal-

anced by the force of vapor rising from the liquid surface when the bottom plunger surface is at the liquid surface, and

means coupled to the plunger for indicating the descent of the plunger in the column,



whereby the point in the descent of the plunger at which an abrupt change of the plunger descent rate occurs is determinable to indicate the liquid level.

3,992,942

APPARATUS FOR DETERMINING WET BULB GLOBE TEMPERATURE

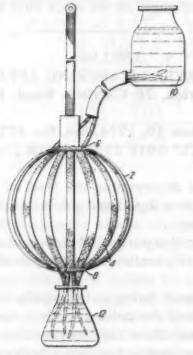
Lorne A. Kuehn, Downsview, and Lloyd E. McHattie, Willowdale, both of Canada, assignors to Her Majesty the Queen in right of Canada, as represented by the Minister of National Defence, Ottawa, Canada

Filed Mar. 11, 1974, Ser. No. 449,855

Claims priority, application Canada, Mar. 30, 1973, 167561

Int. Cl.² G01W *1/17*

U.S. Cl. 73—336.5 **22 Claims**



1. A wet bulb globe temperature index measuring instrument for determining the wet bulb globe temperature index of the surroundings comprising a 4-inch diameter metallic sphere with a black external surface and an emissivity of substantially 0.95 provided with a fabric cover jacket over at least a part of its external surface, means for maintaining said cover jacket at least partially wet when exposed to the environment, and a temperature sensing device located substantially at the center of said globe sphere to determine the temperature at said center and to provide a measurement of the wet bulb globe temperature index of the surroundings.

3,992,943

TWO-INPUT PYROMETER

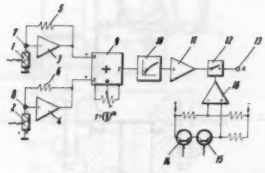
Peter Schiefer, Mulheim, and Heinz Bosebeck, Mettmann, both of Germany, assignors to Mannesmann Aktiengesellschaft, Dusseldorf, Germany

Filed Jan. 30, 1975, Ser. No. 545,415

Claims priority, application Germany, Feb. 4, 1974, 2405651

Int. Cl.² G01J *5/30, 5/60*

U.S. Cl. 73—355 R **6 Claims**



1. Pyrometer for measuring temperature using first and second photosensitive devices for receiving radiation of different wavelength from the object whose temperature is to be measured, comprising:

the photosensitive devices being photoelements;

a first and a second d.c. amplifier with high gain and respectively connected with an input terminal to the first and second photoelement each of said amplifiers having an output terminal;

a first and second feedback resistor connected respectively from output to input of the first and second amplifier so that zero voltage is dynamically established across each photoelement being passed through with short circuit current over a particular range of radiation and temperature to be measured;

a circuit forming an output signal representing the quotient of two input signals as applied to two input terminals of the circuit, the outputs of the amplifiers being respectively connected to the input terminals of the circuit to provide the inputs whose ratio is formed by the circuit; and

means connected to the circuit for receiving said output signal therefrom and providing a representation of said quotient in representation of the temperature of the object.

3,992,944

ADSORPTION TYPE GAS-FILLED THERMOMETER

Robert A. Woodle, Nederland, Tex., assignor to Texaco Inc., New York, N.Y.

Filed Dec. 23, 1974, Ser. No. 535,756

Int. Cl.² G01K *5/38*

U.S. Cl. 73—368.2 **11 Claims**

1. An adsorption type gas-filled thermometer, comprising

a temperature sensitive bulb having a gas adsorbent therein connected to a pressure transducer for indicating the amplitude of gas pressure in a closed system connecting said bulb to said transducer, wherein

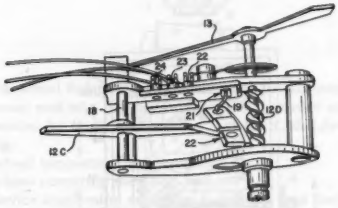
said gas is hydrogen, and
said adsorbent comprises at least one compound consisting

of the formula LT_5, where L is a lanthanide rare earth element and T is a 3d-transition element.

3,992,945
BOURDON PRESSURE GAUGE HAVING DIRECT-COUPLED ELECTRONIC AND VISUAL READOUT

Sherwood P. Judson, Fairfield, Conn., assignor to American Chain & Cable Company, Inc., Bridgeport, Conn.

Filed June 5, 1975, Ser. No. 583,889
Int. Cl.² G01L *9/02, 7/04*
U.S. Cl. 73—398 AR **8 Claims**



1. A Bourdon pressure gauge having a direct-coupled electronic and visual readout comprising:

a. a Bourdon tube having a fixed end communicating with a source of pressure to be measured and a free end connected to linkage means for mechanically coupling said free end to electrical contact means and visual indicator means;

b. visual indicator means displaceable along a displacement path in response to the movement of said free end connected to said linkage means at a position of relatively large displacement amplification as compared to the displacement of said free end;

c. a pressure dial disposed along said displacement path of said visual indicator means, said dial being calibrated to indicate the values of pressure sensed by said Bourdon tube;

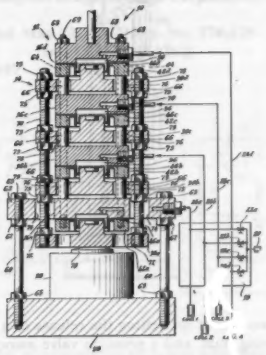
d. electrical contact means displaceable along a displacement path in response to the movement of said free end connected to said linkage means at a position of relatively small displacement amplification as compared to the displacement of said visual indicator means; and

e. a variable resistor disposed along said displacement path of said electrical contact means and in electrical contact therewith, said variable resistor being electrically coupled to circuit means for providing an electrical output indicative of the values of pressure sensed by said Bourdon tube.

3,992,946
HYDRAULIC WEIGHING APPARATUS

Chester D. Bradley, Darien, Conn., assignor to The A. H. Emery Company, New Canaan, Conn.

Filed Dec. 11, 1975, Ser. No. 639,841
Int. Cl.² G01L *7/08*
U.S. Cl. 73—407 R **10 Claims**



1. A weighing apparatus including at least one hydraulic load cell comprising:

A. a piston member,

B. cooperating cylinder means having an inner cylindrical wall for receiving said piston member in freely interfittable, relatively reciprocally movable relation, and

C. a flexible diaphragm of fluid impervious material sealed in said cylinder means and overlying said piston member to form a fluid pressure receiving chamber therebetween, an annular fold of said diaphragm interlying a portion of the free space between said cylindrical wall and said piston member,

said cylinder means having an undercut portion underlying the inner cylindrical wall to permit the inner cylindrical wall to flex in the radial direction in response to fluid pressure received in said pressure receiving chamber and said annular diaphragm fold to maintain the acting area of said diaphragm at a substantially uniform value independently of the relative position of said piston member and cylinder means.

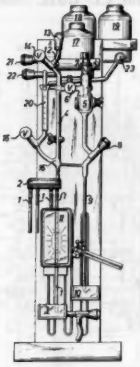
3,992,947
PIPETTING DEVICE

Wolfram Thiemann, and Erich A. Heide, both of Julich, Germany, assignors to Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung, Julich, Germany

Filed Dec. 23, 1974, Ser. No. 536,928
Claims priority, application Germany, Dec. 21, 1973, 2363826
Int. Cl.² B01L *3/02*
U.S. Cl. 73—421 R **3 Claims**

1. A pipetting device which includes in combination: an underpressure chamber, suction conduit means connected to said undepressure chamber, at least one pipet being connectible to said suction conduit means for withdrawing different quantities of pipetting substance, control valve means associated with said underpressure chamber for variably controlling the pressure therein, rinsing fluid receiving chamber means, a rinsing fluid valve associated with said rinsing fluid receiving chamber means for controlling the flow of rinsing fluid from said rinsing fluid receiving chamber means, rinsing fluid conduit means connected to said rinsing fluid receiving chamber means, said pipets being connectible to said rinsing

conduit means, and said underpressure chamber including a liquid chamber with a discharge faucet, a dosing device connected to said rinsing fluid conduit means and arranged between said rinsing fluid control valve and said rinsing fluid



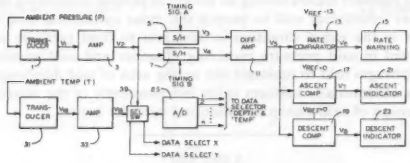
receiving container for setting the release of a selected quantity of rinsing fluid, and a pressure valve associated with said gas under pressure relative to conveying conduit means for emptying said pipet.

3,992,948

DIVER INFORMATION SYSTEM

Nicholas F. D'Antonio, 7695 Admiral Drive, Liverpool, N.Y. 13088, and Richard L. Bates, 125 Hillside Way, Camillus, N.Y. 13031

Filed Sept. 27, 1974, Ser. No. 509,924
Int. Cl.² G06G *7/60*; G01L *13/00*
U.S. Cl. 73—432 R **18 Claims**



1. A system for providing information relating to depth and movement in a fluid, said system comprising:

an electrical power source;

a pressure transducer connected to said electrical power source for generating electrical signals having a parameter reflective of the instantaneous depth;

means for generating alternating first and second timing signals at a regular frequency;

first and second sampling and holding means electrically connected to said pressure transducer and to said means for generating the first and second timing signals, for storing electrical signals generated by said pressure transducer and for alternately transmitting a previously stored electrical signal, in response to the first and second timing signals;

differentiating means electrically connected to said first and second sampling and holding means for generating an electrical signal having a parameter corresponding to the difference between the parameters reflective of the instantaneous depth, of successive signals transmitted by said first and second sampling and holding means;

a reference electrical source for establishing a reference electrical signal having a reference parameter reflective of a predetermined rate of change of depth;

comparing means electrically connected to said differentiating means and to said reference electrical source for comparing said parameter of said signal generated by said differentiating means and said reference parameter, and for generating a warning signal when said parameter of the signal generated by said differentiating means exceeds said reference parameter, said comparing means being normally disabled from performing said comparing and generating functions;

enabling means electrically associated with said comparing means for enabling said comparing means to perform said comparing and generating functions in response to reception of timing signals; and

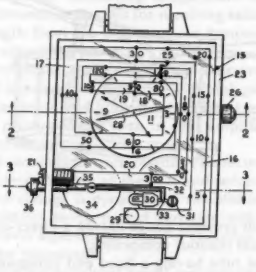
means for generating enabling timing signals to said enabling means at the rate at which said comparing means is to perform said comparing function.

3,992,949

RATE-OF-ASCENT MONITORING INSTRUMENT FOR DIVERS

Bill E. Edmondson, Rte. 1, Box 94-C, Jacksonville, Ark. 72076

Filed Dec. 29, 1975, Ser. No. 644,695
Int. Cl.² G04B *47/06*; G01F *23/14*
U.S. Cl. 73—432 R **8 Claims**



1. An underwater rate-of-ascent monitoring instrument for use by divers comprising:

a rectangular case, a timepiece having an open face dial and a second hand, and a capillary bathometer;

said timepiece and bathometer being fitted water-tightly into said case, said timepiece facing upwardly and underlying said bathometer;

said bathometer comprising a crystal including upper and lower rectangular plates of transparent material rigidly joined through which the dial and secondhand of said timepiece are visible, a capillary channel defined by a groove extending along said lower plate and an aperture downwardly through the upper plate in communication with the groove at one end thereof for providing an open end to said channel;

the **6** o'clock and the **12** o'clock marks on said dial lying along a line parallel to planes defined by the longitudinal edges of said case and said aperture being interposed on said line between the 6 o'clock mark and one end of said case;

said capillary channel defining a square-cornered spiral having at least 1½ convolutions turning counterclockwise

inwardly about said dial from the open end thereof; and closure means at the other end of said channel.

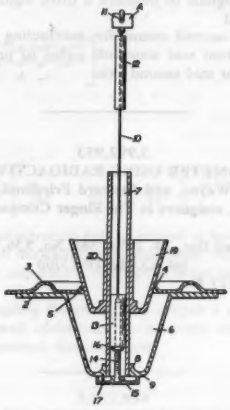
3,992,950
WHEEL BALANCING DEVICE

Theodore Joseph Pflieger, 1247 Dunbar Road, Burlington, Ontario, Canada

Continuation-in-part of Ser. No. 574,227, May 5, 1975, abandoned, which is a continuation of Ser. No. 426,374, Dec. 19, 1973, abandoned. This application Jan. 12, 1976, Ser. No. 648,495

Int. Cl.² G01M 1/12

U.S. Cl. 73—486 **4 Claims**



1. A wheel balancing device adapted for suspension upon the lower end of a flexible cable which is in turn adapted for suspension by hook means from a support, the device comprising:

a wheel supporting member;

a wheel centering member; and

a device suspension means including the said flexible cable and the said hook means;

the wheel supporting member comprising an annular wheel supporting plate having upper and lower surfaces and a central aperture, which when suspended in operation is positioned in a horizontal plane, a cup-shaped member extending from the lower face of the plate around the central aperture, and a hollow tube fastened rigidly to the bottom of the cup-shaped member so as to extend perpendicularly of the plane of the plate through the central aperture to extend a substantial distance above the plane of the plate;

the device providing a horizontal flat bottom surface upon which the device will stand upon a horizontal support surface with the said supporting plate horizontal to receive a wheel;

the wheel centering means being constituted by an inverted extended truncated conical body having a central aperture by which the body is slidable without appreciable play upon the said tube to enter and engage the hub orifice of a wheel supported upon the plate whereby the hub orifice is held by the inverted conical body concentric with the tube;

the said central aperture of the conical body permitting passage of the said hook means therethrough to permit the centering means to be threaded on the flexible cable and to be engaged with the tube while the device is resting upon the said horizontal support surface with the wheel supported thereon;

the suspension means including vertically movable means within the tube to which the lower end of the flexible cable is attached, and means for fixing the position of the vertically movable means within the tube for adjustment of the sensitivity of the balance of the device.

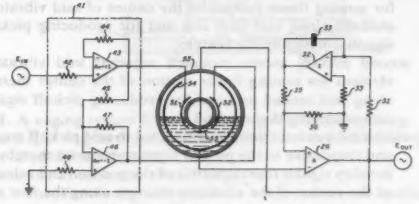
3,992,951
COMPENSATED TOROIDAL ACCELEROMETER

James R. Erspamer, and Howard R. McCombs, both of Phoenix, Ariz., assignors to Sperry Rand Corporation, New York, N.Y.

Filed May 12, 1975, Ser. No. 576,829

Int. Cl.² G01P 15/08

U.S. Cl. 73—497 **7 Claims**



1. In a toroidal accelerometer including a housing, a plurality of electrode means disposed within said housing, electrolytic fluid means at least partially immersing each of said electrode means and amplifier means having an input coupled to the electrode means for providing at the output thereof a signal indicative of the tilt of the accelerometer about a reference axis, said plurality of electrode means including an electrode means totally immersed in said electrolytic fluid and coupled to the output of said amplifier means for temperature compensating said accelerometer; apparatus for preventing polarization of the electrolytic fluid means without affecting the tilt signal comprising:

circuit means having an input coupled to said amplifier means for detecting any d.c. voltage components developed in said amplifier means and, in response thereto, for coupling a compensating signal to an input of said amplifier means until the d.c. voltage is substantially eliminated.

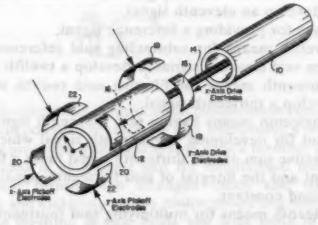
3,992,952
CONTROL SYSTEM FOR ANGULAR DISPLACEMENT SENSOR

Maurice F. Hutton, Pompton Lakes, and Bernard Friedland, West Orange, both of N.J., assignors to The Singer Company, Little Falls, N.J.

Filed Dec. 20, 1974, Ser. No. 534,615

Int. Cl.² G01C 19/56

U.S. Cl. 73—505 **6 Claims**



1. Gyroscopic apparatus including:

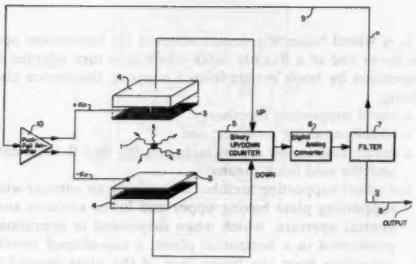
a casing;
first and second support means mounted in said casing;
an elongated vibratory element having its ends supported in said first and second support means and extending between said support means in said casing;
first drive means mounted adjacent said vibratory element at a point intermediate the ends thereof and responsive to electric drive signals for creating drive forces for the center of said vibratory element along a first axis traversing the longitudinal axis of the vibratory element;
second drive means mounted adjacent said vibratory element at the intermediate point thereon and responsive to electric drive signals for producing drive forces for the center of said vibratory element along a second axis traversing the longitudinal axis of the vibratory element;
first pickoff means mounted adjacent said vibratory element for sensing linear motion of the center of said vibratory element along said first axis and for producing pickoff signals corresponding thereto;
second pickoff means mounted adjacent said vibratory element for sensing linear motion of the center thereof along said second axis and for producing pickoff signals corresponding thereto; and
electronic control circuitry connected to said pickoff means and responsive to the pickoff signals produced thereby to develop signals representative of the position and velocity of the center of the vibratory element along the first and second axis at any instant said control circuitry responding to said position and velocity signals to produce drive signals for said drive means so as to permit maintaining an amplitude of vibration of the center of said element essentially constant in any given direction and to force the ellipticity of the vibrational path of the center of said element essentially to zero, said electronic control circuitry comprising:
a. first means to develop a first signal which is the square of the velocity along said first axis;
b. second means to develop a second signal which is the square of the velocity along said second axis;
c. third means for developing a third signal which is the square of the position along said first axis;
d. fourth means for developing a signal which is the square of the position along said second axis;
e. fifth means for multiplying the signal representing the velocity along said first axis by the signal representing the position along said second axis to develop a fifth signal;
f. sixth means for multiplying the signal representing velocity along said second axis by the signal representing position along said first axis to develop a sixth signal;
g. seventh means for subtracting said fifth signal from said sixth signal to develop a seventh signal;
h. eighth means for adding said first and second signals to develop an eighth signal;
i. ninth means for adding said third and fourth signals to develop a ninth signal;
j. tenth means for multiplying said eighth signal by a constant gain to develop a tenth signal;
k. eleventh means for adding said tenth and ninth signals to develop an eleventh signal;
l. means for providing a reference signal;
m. twelfth means for subtracting said reference signal from said eleventh signal to develop a twelfth signal;
n. thirteenth means for filtering said twelfth signal to develop a thirteenth signal;
o. fourteenth means having said thirteenth signal as an input for developing a fourteenth signal which is the negative sum of said thirteenth signal times a first constant and the integral of said thirteenth signal times a second constant;
p. fifteenth means for multiplying said fourteenth signal by said signal representing velocity along said first axis to develop a fifteenth signal;
q. sixteenth means for multiplying said fourteenth signal by said signal representing velocity along said second axis to develop a sixteenth signal;
r. seventeenth means for filtering said seventh signal to develop a seventeenth signal;
s. eighteenth means having said seventeenth signal as an input for developing an eighteenth signal which is the sum of said seventeenth signal times a constant and the integral of said seventeenth signal times a constant;
t. Nineteenth means for multiplying said eighteenth signal by said signal representing position along said second axis to develop a nineteenth signal;
u. twentieth means for multiplying said eighteenth signal by the signal representing position along said first axis;
v. twenty-first means for adding said fifteenth and nineteenth signals to produce a drive signal for said first axis; and
w. twenty-second means for subtracting said twentieth signal from said sixteenth signal to produce a drive signal for said second axis.

3,992,953

ACCELEROMETER USING RADIOACTIVE PICKOFF

Bo H. Ljung, Wayne, and Bernard Friedland, West Orange, both of N.J., assignors to The Singer Company, Little Falls, N.J.

Filed Dec. 24, 1974, Ser. No. 536,141
Int. Cl.² G01P 15/08
U.S. Cl. 73—517 B **6 Claims**



1. An accelerometer comprising:
a. an evacuated casing having at least two opposed parallel walls, said walls forming electrodes;
b. radioactive detectors mounted to said two parallel side walls providing outputs proportional to radiation sensed thereby;
c. a radioactive mass having a diameter of the order of 0.001 to 0.002 times the distance between said parallel side walls;
d. a up-down counter having its up input coupled to one of said radioactive detectors and its down output coupled to the other of said radioactive detectors;
e. a digital to analog convertor having its input coupled to the output of said counter for converting said output into an analog value;
f. a filter having the transfer function:

$$\frac{U(s)}{Y(s)} = \frac{-(k_1l_1 + k_2l_2 + k_3)s^2 + (k_2l_1 + k_3l_2)s + k_3l_1}{[s^3 + (k_1 + L_2)s + k_1l_+ + k_2 + l_1]}$$

$$\frac{A(s)}{Y(s)} = \frac{k_3(s^2 + l_2s + l_1)}{[s^3 + (K_1 + l_2)s + k_1l_1 + k_2 + l_1]}$$

where U(s) represents a correction output u of the filter in Laplace form, A(s) represents an estimate of the acceleration a in the Laplace form and $Y(s)$ represents the input to the filter in Laplace form, k_i and l_i are the elements of the gain matrices K and L where K equals:

$$K = \begin{bmatrix} 2^{1/3}A^{1/3}d^{2/3}/\lambda^{2/3} \\ 2^{2/3}A^{2/3}d^{1/3}/\lambda^{1/3} \\ A \end{bmatrix}$$

and L equals:

$$L = 4\lambda^4 \left[\frac{1}{2\lambda^3}, \frac{1}{2\lambda^3}, \frac{1}{4\lambda^4} \right] = [2\lambda^3, 2\lambda, 1]$$

is the mean disintegration rate as sensed at both side walls, A is the change in acceleration in the mean interval $\Delta t = \lambda^{-1}$ between pluses, and d is the distance between said parallel side walls; and

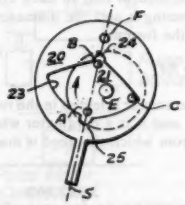
g. means coupling the correction output u of said filter to said side wall electrodes to maintain said radioactive particle centered therebetween.

3,992,954

MOTION TRANSLATING MECHANISM FOR INDEXING AND ESCAPEMENT DRIVES

Leo Kull, 58 Westover Ave., West Caldwell, N.J. 07006

Filed June 2, 1975, Ser. No. 583,182
Int. Cl.² F16H *27/02*; G04B *15/14*
U.S. Cl. 74—1.5 **16 Claims**



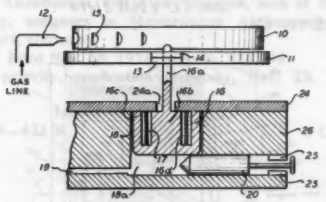
1. A motion translating device having a rotating member and a pivoting member working next to each other on same plane, said rotating member having a center of rotation and three acting points equally spaced on a circle concentric to said center of rotation, said pivoting member having an arm with a pivot point not coinciding with said center of rotation, said pivoting member having a line of symmetry passing through said pivot point and having an equal moving freedom to either side of said center of rotation with a total moving freedom equalling the radius of said circle, said pivoting member having a shape generated by two of said acting points when the third of said point is restricted to stay on said line of symmetry and said pivoting member is oscillating within said moving freedom, said two acting points following the contour of said generated shape and maintaining a positive translation of motions between said rotating and pivoting member in either direction during said oscillation.

3,992,955

TWO AXIS CAGING SYSTEM

John L. Evans, Oakland, and Donald R. Boerner, Wayne, both of N.J., assignors to The Singer Company, Little Falls, N.J.

Filed Nov. 18, 1974, Ser. No. 524,456
Int. Cl.² G01C *19/24*
U.S. Cl. 74—5.1 **10 claims**



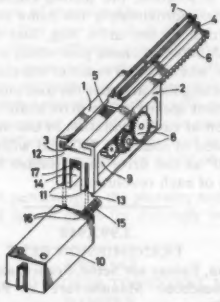
1. A caging system for a gyro having a rotor comprising:
a. a split ring having a flexure portion about which said ring is permitted to bend,
b. a tab at each end of said ring,
c. means for driving said tabs from a first to a second spatial separation between said tabs including means interposed between said tabs and operable for moving said tabs from said first to said second spatial separation between tabs and a source of gas acting on said means interposed between said tabs for driving said tabs from said first to said second spatial separation, whereby said ring presents a surface to a surface of said gyro rotor to maintain said gyro rotor in a plane constant to the plane of said ring.

3,992,956

MULTI-GEAR TRANSMISSION FOR TOYS

Artur Fischer, Altheimer Str. 219, D-7241 Tumlingen, Germany

Filed Nov. 8, 1974, Ser. No. 522,215
Claims priority, application Germany, Nov. 10, 1973, 2356209
Int. Cl.³ F16H *19/04*
U.S. Cl. 74—29 **10 Claims**



1. A longitudinal-reciprocation transmission component for multi-component toy assembly kits, comprising a transmission housing provided with a guide slot; a rack member received in and guided in said guide slot for longitudinal movement; a multi-gear transmission arranged inside said transmission housing and including a drive pinion projecting into said guide slot and meshing in said guide slot with teeth of said rack member; and connecting means comprising undercut grooves provided on said transmission housing for directly and releas-

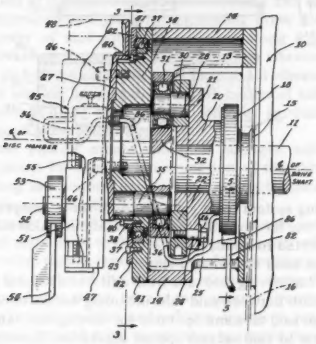
ably connecting said transmission housing with other components of a toy assembly kit.

3,992,957

ROTARY TYPE SHAPER MOTION DRIVE

Chester M. Wiig, Lincolnwood, Ill., assignor to F. J. Littell Machine Company, Chicago, Ill.

Filed Aug. 12, 1974, Ser. No. 496,513
Int. Cl.² F16H *21/14*
U.S. Cl. 74—67 **5 Claims**



1. In feeding mechanism for feeding strip material, the conbination including a housing journalling a press drive shaft adapted to rotate at substantially uniform speed, a drive ring fixed to the drive shaft and providing a first crank pin eccentric to the axis of rotation, a circular disc member mounted by the housing for rotation on an axis spaced from the axis of rotation of the drive ring, a link member having association with a second crank pin at one end thereof, said link member having location in the housing between the drive ring and the disc member and said link member at its end opposite the second crank pin having an eccentric connection with the drive shaft by having a pivotal connection with the first crank pin, the other end of the link member having pivotal connection with the disc member by means of the second crank pin which has a position in the disc member eccentrically as regards its axis of rotation, the second crank pin on the disc member having approximately the same radius as the first crank pin carried by the drive ring, and the link member having a length between crank pins which is not greater than the said radius, whereby as a result of the eccentric crank pins and the connecting link member the disc member is caused to rotate at different speeds as the drive shaft rotates so that for a minor portion of each revolution of the drive shaft the disc member is caused to rotate for 180° and will also be caused to rotate for 180° as the drive shaft rotates for the remaining major portion of each revolution.

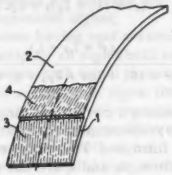
3,992,958

TRANSMISSION BELT

Alain Bonnefon, Epinay sur Seine, France, assignor to Pneumatiques, Caoutchouc Manufacture et Plastiques Kleber-Colombes, France

Filed Nov. 21, 1974, Ser. No. 525,929
Claims priority, application France, Nov. 21, 1973, 73.41371
Int. Cl.² F16G *1/00, 5/00*
U.S. Cl. 74—231 R **15 Claims**

1. A transmission belt, having a portion possessing tensile strength that consists solely of a thin, flat strip with no other reinforcing cord or cable, characterized in that said strip comprises at least two thin, superposed layers bonded together and composed of a flexible elastomer or plastomer matrix reinforced with irregular elongated fibrils dispersed in the matrix with a dominant orientation in the longitudinal



direction of the strip such that this strip has a tensile strength of at least 20 kg/cm² with 1% elongation.

3,992,959

TENSION RESISTANT STRUCTURE FOR DRIVING BELTS AND THE LIKE

Mario Cicognani, Milan, Italy, assignor to Industrie Pirelli S.p.A., Milan, Italy

Filed Feb. 28, 1975, Ser. No. 554,189
Claims priority, application Italy, Mar. 7, 1974, 49092/74
Int. Cl.² F16G *5/00, 1/22, 5/10*
U.S. Cl. 74—234 **9 Claims**

1. A tension resistant structure for driving belts and the like, of the type formed by a plurality of cords having their axes parallel and positioned along the layout of the belt, each cord being formed by seven threads of textile fibers twisted together characterized in that in each cord the pitch p of the threads constituting it and the diameter d of the threads are correlated by the formula

$$p\,(1+K) = Rd$$

where R is a parameter selected in the range of values between 27.4 and 35.1 and K is a parameter whose values depend on the material from which the cord is made.

3,992,960

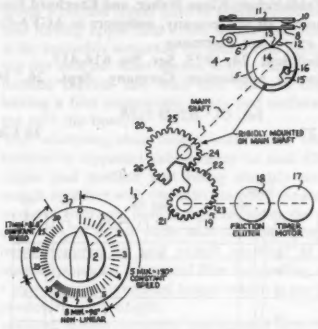
TWO SPEED MANUAL PRESET TIMER

Roger D. Rulseh, New Holstein, Wis., assignor to Deltrol Corporation, Belwood, Ill.

Filed Feb. 3, 1975, Ser. No. 546,409
Int. Cl.² F16H *35/02, 55/04;* H01H *47/18*
U.S. Cl. 74—393 **3 Claims**

1. In a two speed timer, the combination of, a control device, said control device having a first position and a second position, means for moving said control device from its first position to its second position, timing means for returning the control device from its second position to its first position, said timing means including operating means for the control device, said operating means having a timed out position at which it returns the control device and being movable from said timed out position through a timing range, means for driving said operating means through said timing range toward said timed out position, said drive means including a constant speed timing motor, a drive gear driven by the timing motor, a driven gear constantly meshing with the drive gear and

driven thereby, said driven gear being arranged to actuate said operating means, each of said gears having a segment of relatively small uniform pitch radius, a segment of relatively large uniform pitch radius and a transition segment of increasing pitch radius connecting the relatively small pitch radius segment with the relatively large pitch radius segment, said gears



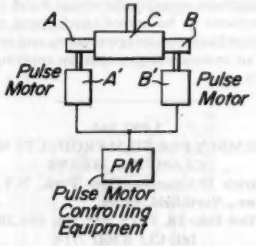
being arranged to drive the operating means at a relatively high constant speed through a portion of the timing range adjacent the timed out position, at a relatively low constant speed through a portion of the timing range remote from the timed out position, and at an increasing speed through an intermediate portion of the timing range.

3,992,961

NUMERICALLY CONTROLLED REVERSIBLE GEAR SYSTEM FOR REMOVING BACKLASH

Kojiro Saito, Saitama, Japan, assignor to Yutaka Seimitsu Kogyo Ltd., Yono, Japan

Filed Sept. 4, 1975, Ser. No. 610,261
Int. Cl.² F16H *55/18*
U.S. Cl. 74—409 **1 Claim**



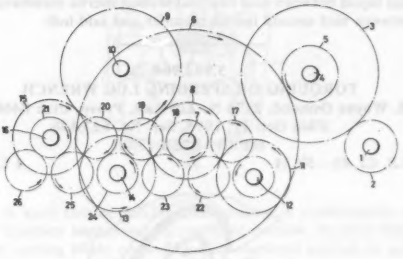
1. A numerically controlled reversible gear system for removing backlash comprising a main output gear, first and second driving gears each having the same number of teeth thereon, first and second pulse motors having substantially the same specifications, each pulse motor having a rotor pole and stator poles and a rotationally neutral position wherein the attractive force between respective rotor pole and stator poles is balanced, a frame body mounting said main output gear, said first and second driving gears and said first and second pulse motors, a numerical controlling equipment coupled to said first and second pulse motors for identically controlling said first and second pulse motors' rotation, said first driving gear being coupled to said first pulse motor and meshed with said main output gear, said second driving gear being coupled to said second pulse motor and meshed with said main output gear, said first and second driving gears being meshed with said main output gear with said first and second pulse motors being shifted from said neutral position in equal and opposite directions by a predetermined number of teeth in said driving gears so that an attractive force exists between the respective rotor pole and stator poles in said first and second pulse motors.

3,992,962

DRIVING TRAIN FOR STRAIGHTENING ROLLS

Karlheinz Altenbokum, and Klaus Hansgen, both of Witten, Germany, assignors to Mannesmann Aktiengeselischaft, Dusseldorf, Germany

Filed Nov. 18, 1974, Ser. No. 524,678
Claims priority, application Germany, Nov. 23, 1973, 2359039
Int. Cl.² F16H *1/12, 1/20*
U.S. Cl. 74—421 R **3 Claims**



1. In a drive train for the rolls of a straightening machine arranged in an upper and a lower row and wherein each roll is driven by a gear, these gears being arranged in groups of three, wherein each group pertains to one such group only, and one gear of any of said groups pertains to a roll of one of the rows and the other two gears of the same group pertain to rolls of the other row, and wherein the one gear of a group of the groups is shaft driven by a larger gear, there being a plurality of such larger gears accordingly, as many as there are groups, the drive train further including input drive means for driving a shaft, the improvement comprising:

a first one of the gears of the plurality being on said shaft, and one gear of a first group of the groups whose one gear pertains to a roll of a particular row, being also on said shaft and being shaft driven accordingly;

two further gears of the plurality meshing with and being driven by the first gear and shaft-driving one gear each respectively of two different groups of the groups whose respective one gear each pertains to a roll of the respective other row for both said different groups;

a fourth gear of the plurality meshing with play with one of the further gears and shaft-driving one gear of a group of the groups, different from said first and said two groups, and whose one gear pertains to a roll of the particular row; and

a fifth gear, not pertaining to the plurality and meshing with the first and fourth gears for drivingly interconnecting them.

3,992,963

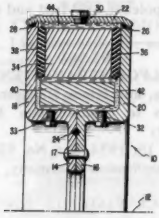
ELASTOMER AND LIQUID TORSIONAL VIBRATION DAMPER

Jai K. Khanna, Indianapolis, Ind., assignor to Wallace-Murray Corporation, New York, N.Y.

Filed Jan. 21, 1975, Ser. No. 542,677
Int. Cl.² F16F *15/10*
U.S. Cl. 74—574 **14 Claims**

1. A torsional vibration damper including, an annular hub member, said hub adapted to be coupled to a rotary shaft subject to torsional vibrations, a first inertia member resiliently coupled by elastomer to said hub, a closed cavity adjacent to and positioned at the radially outermost portion of said hub, a second inertia member, said second inertia member

positioned within said cavity and surrounded by a liquid of relatively high viscosity, a liquid shear coupling defined by

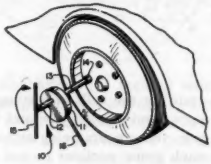


said liquid between said first and second inertia members and between said second inertia member and said hub.

3,992,964
TORQUING OR SPEEDING LUG WRENCH

M. Wayne Osmond, 2176 N. 220 East, Provo, Utah 84601

Filed Oct. 17, 1975, Ser. No. 623,636
Int. Cl.² B25B 17/00
U.S. Cl. 81—57.31 1 Claim



1. A wrench comprising

a housing;

a bracing rod fixed to and extending from said housing;

a gear assembly in said housing, said gear assembly including

a first gear mounted to rotate with respect to said housing,

a second gear coaxially arranged with respect to said first gear and mounted to rotate within the said housing, said second gear being of different diameter than said first gear, and intermediate gears interconnecting said first and second gears whereby rotation of either of said first or second gears will rotate the other of said first or second gears at a different speed;

a first drive shaft fixed to and rotatable with said first gear, said first drive shaft being mounted against axial movement and journaled through said housing, and having a magnetized socket on the end thereof projecting from the housing;

a second drive shaft fixed to and rotatable with said second gear said second drive shaft being mounted against axial movement, journaled through the housing and having a magnetized socket on the end projecting from the housing, said first and second drive shafts being axially aligned and projecting oppositely to one another and each extending from the housing such that the housing is spaced from a vehicle tire when a wrench socket coupled to the magnetized socket of either drive shaft is in engagement with a wheel lug nut of the vehicle;

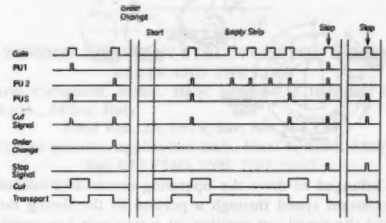
a wrench socket including means adapted to be coupled to the magnetized socket of either drive shaft; and

a handle having a gripping portion adapted to extend transversely to the first and second drive shafts and a coupling portion intermediate the length of said transversely extending portion whereby the handle is coupled to the magnetized socket of each drive shaft, the length of each part of the gripping portion extending from the coupling portion being shorter than the length of the bracing rod.

3,992,965
METHOD AND ARRANGEMENT FOR CUTTING AND SORTING PHOTOGRAPHIC PRINTS, AND THE LIKE

August Hell, Feldkirchen; Klaus Weber, and Eberhard Escales, both of Munich, all of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany

Filed Sept. 24, 1975, Ser. No. 616,417
Claims priority, application Germany, Sept. 26, 1974, 2445999
Int. Cl.² B26D 5/38
U.S. Cl. 83—27 26 Claims

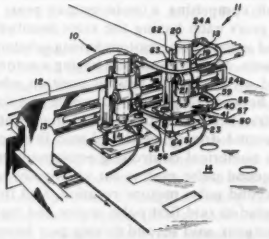


1. A method of processing a plurality of customer orders, wherein each customer order has the form of a segment of an image band, each segment being comprised of one or more image sections bearing respective images, particularly for use in an automated processing laboratory, comprising, in combination, the steps of providing the image band with order marks of different types, each image section of one customer order being provided with an order mark of one type and each image section of the next customer order being provided with an order mark of another type so that the order mark type changes from one customer order to the next on the image band; detecting the changes of order mark type using detecting means operative for generating control signals depending upon such detection; severing the image band at intervals to form band sections to be sorted, each band section being constituted by at least one image section; and controlling the operation of an order-sorting means by applying the control signals thereto.

3,992,966
PUNCH ASSEMBLY FOR FILM PRODUCTS WITH WORK CLAMPING MEANS

Salvatore Patrick D'Agostino, Deer Park, N.Y., assignor to Sheldahl, Inc., Northfield, Minn.

Filed Feb. 18, 1975, Ser. No. 550,202
Int. Cl.² B26D 7/14
U.S. Cl. 83—175 7 Claims



1. In a punch assembly for perforation of flexible film prod-

ucts with cooperatively arranged punch and die assemblies, and comprising:

a. frame means for retaining a reciprocating punch and a stationary die;

b. a punch assembly including a punch member mounted on said frame means and including drive means for stroking said punch member in reciprocatory to-and-fro motion along a certain linear path of a first predetermined length and having upper and lower linear path limits;

c. a die assembly mounted on said frame means and including die and die base means with a punch-receiving bore formed therein and with said die and die base means having a film supporting upper pad surface circumscribing said die bore;

d. film clamping shoe means with a film clamping lower surface in opposed relationship to said film supporting upper pad surface and being slidably secured to said punch member with resilient coupling means and adapted to move with said punch member along the upper portion only of said linear path, said film clamping shoe means being secured to said punch member at an elevation normally spaced from said film supporting upper surface a second predetermined length which is less than said first predetermined length;

e. resilient means normally biasing said film clamping shoe toward said film supporting upper surface and arranging for compressive engagement of flexible film between said film supporting upper surface and said film clamping surface upon driving of said punch means toward said die a stroke length at least equal to said second predetermined distance; and

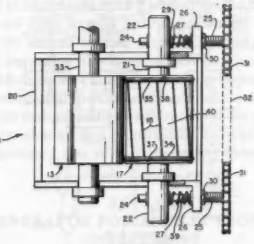
f. flange means being disposed along said film supporting upper surface extending radially outwardly from the edge of said bore and in circumscribing relationship to said die bore, and wherein the upper edge surface of said flange is spaced upwardly from said film supporting upper surface and terminates radially inwardly of the inner edge surface of the film clamping lower surface of said clamping shoe.

3,992,967

FIBER CUTTER

Morris Fram, Sun Valley, Calif., assignor to Ransburg Corporation, Indianapolis, Ind.

Filed Oct. 31, 1975, Ser. No. 627,870
Int. Cl.² D01G *1/04*
U.S. Cl. 83—347 **8 Claims**



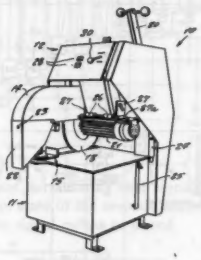
1. A fiber cutter comprising rotatable cutter roll means and rotatable back-up roll means in cooperative relationship to provide a nip, the cutter roll menas including fiber cutter blades and the back-up roll means including a resilient surface engaging with the cutter blades for cutting fiber in the nip into short lengths, and shaped annular means fixedly attached to the extremities of the cutter roll, each of said shaped annular means having a diameter slightly greater than the diameter of the cutter roll and an annular surface of progressively reduced thickness which engages with the circumferential surface of the back-up roll so as to maintain the spacing between the cutter roll and the back-up roll substantially constant during operation of the fiber cutter, and means to drive the fiber cutter.

3,992,968

STEEL CUTTING MACHINE

Mario Brcic, 807-94th Ave. N., Naples, Fla. 33940

Filed Oct. 6, 1975, Ser. No. 619,945
Int. Cl.² B23D *45/02*
U.S. Cl. 83—468 **1 Claim**



1. A steel cutting machine, comprising in combination, a base member supporting an overhead portion, an ultra high speed cutting blade carried by said overhead portion to cut through material held down by the hand of an operator, an angle adjuster member carried by said base for adjusting the angle of said material when directed against said blade, said blade being secured by nut fastener means and washer plate means to a drive of a high speed motor contained within said overhead portion, said high speed motor rotating said blade at ultra high speed, thus effecting a quick cut of said material when placed upon said base member, a fender secured to said overhead portion, said fender carrying a downward shield, said fender and said shield enclosing around a forward edge of said blade, said shield having a viewing opening therethrough for observation of a cutting action by said blade, said angle adjustment member being L-shaped by including a flat horizontal portion and a pair of upwardly vertical lip portions along one edge thereof, said lip portions being straight aligned with each other and having a notch therebetween that communicates with a flaring notch in said horizontal portion of said angle adjustment member, a calibrated, arcuate notch on said horizontal portion receiving a vertical bolt secured to said base member and about which said angle adjustment member is pivotable to change an angle of said lip portion respective to said blade, a straight slot upon said base portion, and in which said blade extends, said vertical bolt being aligned with said base member slot and positioned near one end thereof, said angle adjustment member resting against an arcuately affixed plate upon said base.

3,992,969

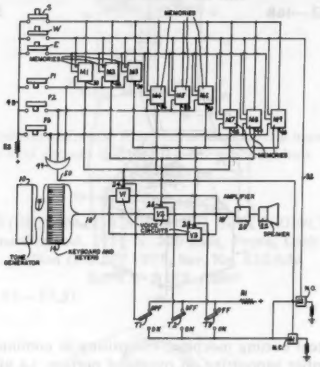
CHANGEABLE PRESET SYSTEM FOR ELECTRONIC ORGANS

John William Robinson, and Billy Joe Whittington, both of Jasper, Ind., assignors to Kimball International, Inc., Jasper, Ind.

Filed June 18, 1975, Ser. No. 588,065
Int. Cl.² G10H *1/00*
U.S. Cl. 84—1.01 **4 Claims**

1. In an electronic organ having a tone generator and an electroacoustic transducer and keying means connecting the generator to the transducer and voice circuits interposed between the keying means and the transducer with each voice circuit having a voltage sensitive control terminal responsive to a first voltage signal to make the respective voice circuit effective and to a second voltage signal to make the respective

voice circuit ineffective, a tab switch connected to each control terminal and having respective positions in which a respective one of said first and second voltage signals is supplied to the respective control terminal; a group of memory circuits which can assume a first and second voltage conditions and each having an output terminal connected to one control terminal, a control switch for each group of memory circuits, a write switch connected to all of said memory circuits, means



responsive to actuation of said write switch while a said control switch is also actuated to cause those memory circuits of the group pertaining to the respective control switch and having tab switches in said first position to go to said first voltage condition thereof, an erase switch connected to said memory circuits, and means responsive to actuation of said erase switch while a said control switch is actuated for causing all of the memory circuits in the respective group thereof to go to the said second voltage condition thereof.

3,992,970

ELECTRONIC MUSICAL INSTRUMENT

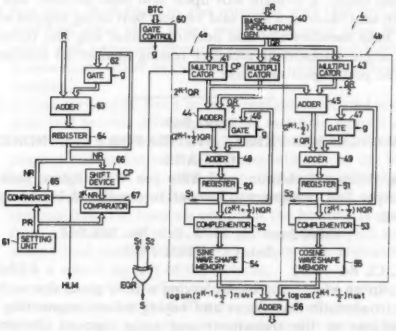
Masanobu Chibana, and Tsuyoshi Futamase, both of Hamamatsu, Japan, assignors to Nippon Gakki Seizo Kabushiki Kaisha, Japan

Filed Nov. 11, 1975, Ser. No. 630,862

Claims priority, application Japan, Nov. 15, 1974, 49-131781

Int. Cl.² G10F *1/00*

U.S. Cl. 84—1.11 **6 Claims**



1. An electronic musical instrument of a type wherein amplitudes at sequential sample points of a musical tone waveshape are calculated by sequentially calculating amplitudes of respective harmonic contents at each of the sample points with a regular time interval in accordance with basic information (where R represents frequency information and $Q = 1, 2, 3 \ldots$) and thereafter cumulatively adding the amplitudes of the respective harmonic contents comprising:

a first harmonic calculator for sequentially counting, with said regular time interval, amplitudes of respective harmonic contents of a first waveshape content of a composite musical tone waveshape composed of two tones of different footage and represented by a single multiplication term of a sine waveshape content and a cosine waveshape content to produce logarithmically expressed information corresponding to said amplitudes of respective harmonics of the first waveshape content;

a second harmonic calculator for sequentially counting, with said regular time interval, amplitudes of respective harmonic contents of a second waveshape content of said composite musical tone waveshape to produce logarithmically expressed information corresponding to said amplitudes of respective harmonics of the second waveshape content

means for sequentially synthesizing said logarithmically expressed information of respective harmonic content amplitude of said first and second waveshape contents;

composite amplitudes of said first and second waveshape contents by each degree of harmonic being sequentially produced with said regular time interval and said composite amplitudes being cumulatively added for producing composite musical tone waveshape amplitudes of the coupled tones of different footage.

3,992,971

ELECTRONIC MUSICAL INSTRUMENT

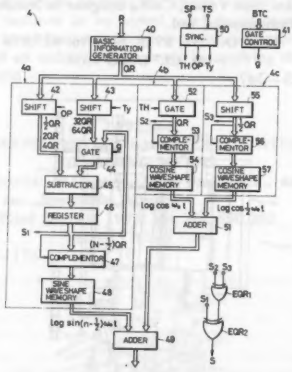
Masanobu Chibana, and Tsuyoshi Futamase, both of Hamamatsu, Japan, assignors to Nippon Gakki Seizo Kabushiki Kaisha, Japan

Filed Nov. 11, 1975, Ser. No. 630,861

Claims priority, application Japan, Nov. 15, 1974, 49-131782

Int. Cl.² G10F *1/00*

U.S. Cl. 84—1.11 **5 Claims**



1. An electronic musical instrument of a type wherein wave values at successive sample points of a musical tone waveshape are calculated by sequentially calculating wave values of respective harmonic components at each of the sample points with a regular time interval and cumulatively adding the wave values of the respective harmonic components comprising:

a harmonic calculator for sequentially calculating, with said regular time interval, a sine wave component including a harmonic order of a composite wave of a group of har-

monics represented by a single multiplication term of a sine wave component including the harmonic order and a cosine wave component not including the harmonic order of each harmonic group;

a cosine wave component calculator for calculating said cosine wave component not including the harmonic order of said composite wave in accordance with phase angle information of the fundamental wave; and

means for sequentially synthesizing information of said respective components provided from said harmonic calculator and said cosine wave components calculator;

composite wave values of respective groups of harmonics being sequentially produced with said regular time interval and said composite wave values being cumulatively added for producing musical tone waveshape of all the harmonic components included in the respective groups of harmonics.

3,992,972

PICKUP MOUNTING FOR STRINGED INSTRUMENT

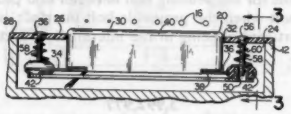
James H. Rickard, Harwinton, Conn., assignor to Ovation Instruments, Inc., New Hartford, Conn.

Filed Mar. 10, 1975, Ser. No. 556,897

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 3, 1976

Int. Cl.² G10H *3/00, 3/08*

U.S. Cl. 84—1.16 **7 Claims**



1. An electrical pickup mounting system for a stringed musical instrument, said mounting system comprising, in combination, a stringed instrument having a set of strings, a body with a top plate, a cavity below said top plate and a hole through said top plate located below said set of strings and communicating with said cavity, a pickup having a housing partially received in said cavity and extending through said opening towards said set of strings, said pickup also including at least one flange extending laterally outwardly from said housing and located in said cavity, a plurality of mounting elements of resilient material carried by said at least one flange and each having an opening facing said top plate, a plurality of screws each having a head on the outer side of said top plate and each having a threaded shank passing through said top plate and extending into the opening of a respective one of said mounting elements, means received in each of said mounting element openings for making threaded connection with the associated one of said screws, and a plurality of helical compression springs each received on a respective one of said screw shanks and compressed between said top plate and the associated one of said mounting elements.

3,992,973

PULSE GENERATOR FOR AN ELECTRONIC MUSICAL INSTRUMENT

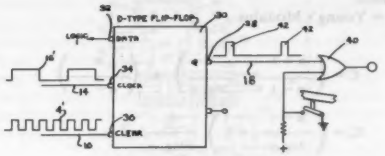
Stephen L. Howell, Jasper, Ind., assignor to Kimball International, Inc., Jasper, Ind.

Filed Sept. 18, 1974, Ser. No. 507,228

Int. Cl.² G10H *1/06, 5/06*

U.S. Cl. 84—1.23 **7 Claims**

1. In a method of generating musical tones of predetermined harmonic content which comprises; supplying a first train of rectangular pulses at audible frequency and a second train of rectangular pulses at a frequency which is a whole multiple of the frequency of said first pulse train, each said supply having a first voltage state during each pulse thereof and a second voltage state in the interval between successive pulses and each pulse having leading and trailing edges, initiating a signal pulse substantially at one of the leading and trailing edges of a said first pulse when said second supply is in one



of said states thereof, terminating each signal pulse at the next following change of state of the respective said second supply, and converting the signal pulses to sound.

3,992,974

CONICAL WASHER FOR A HIGH TENSILE STRENGTH BOLT

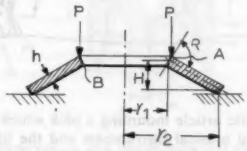
Takeshi Miki, Sagamihara; Toshitaka Tamano, Machida, and Takao Yokokawa, Tokyo, all of Japan, assignors to Nippon Steel Corporation, Tokyo, Japan

Filed Apr. 8, 1975, Ser. No. 566,521

Claims priority, application Japan, Apr. 10, 1974, 49-39877

Int. Cl.² F16B *43/00*

U.S. Cl. 85—50 R **3 Claims**



1. A conical washer for a high tensile strength bolt comprising:

a hollow, truncated metallic cone having:

an inclined sidewall of thickness h having a rectangular longitudinal cross section,

a top opening at the top of said cone having a radius r_1 from the center thereof to the inside edge of the top of said sidewall,

a bottom opening at the bottom of said cone parallel to said top opening and concentric therewith having a radius r_2 from the center thereof to the inside edge of the bottom of said sidewall, and

a height H equal to the vertical distance between the centers of the parallel ends of the rectangular cross sectioned sidewall;

said washer being of a material having a yield stress σy; and

the relationship between said yield stress, the composition of said metal, and the dimensions of said cone being a constant γ defined by:

$$\gamma = \left| \frac{-ECHh}{\frac{1}{(1-\frac{1}{m^2})r_s^2}} \left(\frac{C_2 H}{2h} + C_3 \right) \right|_{\sigma y}$$

wherein:

E = Young's Modulus

$$C = \left(\frac{\alpha+1}{\alpha-1} - \frac{2}{\log_e \alpha} \right) \pi \left(\frac{\alpha}{\alpha-1} \right)^2$$

$$C_2 = \left(\frac{\alpha-1}{\log_e \alpha} - 1 \right) \frac{6}{\pi \log_e \alpha}$$

$$C_3 = \frac{3(\alpha-1)}{\pi \log_e \alpha}$$

$$\alpha = \frac{r_2}{r_1}$$

m = Poissons Number

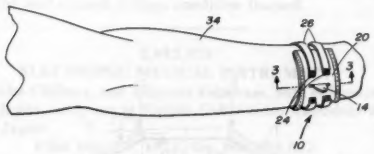
and γ is equal tc or greater than 4, whereby compressing said cone causes it to deform plastically before it is flattened with a substantially constant deformation load during the progress of the plastic deformation.

3,992,975

PROSTHETIC GUITAR PICK

Evan Patrick Gallagher, 509 Rock Glen Road, Baltimore, Md. 21229

Filed Oct. 8, 1975, Ser. No. 620,848
Int. Cl.² G10D 3/16
U.S. Cl. 84—322 **6 Claims**



1. A prosthetic article mounting a pick which is useful for playing stringed musical instruments and the like, the prosthetic article being adapted to at least a portion of the lower extremity of the users' arm, the prosthetic article comprising:

mold means rigidly mounting the pick;

casing means for holding the mold means; and,

strap means adapted to conform to and attach the casing means to the arm of a user of the article, the pick extending outwardly from the casing and mold means and being engageable with and movable relative to the strings of a stringed musical instrument.

3,992,976

LIQUID PROPELLANT GUN

Bruce Bartels; John W. Holtrop; Larry L. Liedtke, and Russell T. Trovinger, all of Ridgecrest, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sept. 12, 1975, Ser. No. 612,817
Int. Cl.² F41F 1/04
U.S. Cl. 89—7 **20 Claims**

1. In a liquid propellant gun, the combination comprising:

a composite block including an intermediate section, a forward section, and a rearward section;

said forward section and said rearward section having axial aligned bores therethrough;

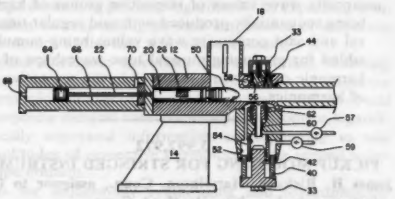
a gun barrel attached to said forward section having a bore co-axial with said aligned bores;

a bolt in said rearward section closely fitted for sliding movement within the said bore therethrough;

said intermediate section including an opening communicating with said aligned bores;

fuel supply means communicating with said opening;

valve means in said opening movable from a first position admitting fuel to said aligned bores and a second position fully closing said opening and forming a smooth wall portion in alignment with the walls of said bores;



said rearward section also including an opening for admitting projectiles in front of said bolt;

means for moving said bolt rearwardly to allow introduction of a projectile and forwardly to position said projectile within said bores;

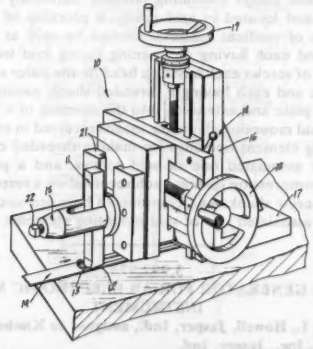
and means for introducing fuel between said projectile and said bolt when the projectile-bolt interface is presented athwart said opening in the intermediate section of said block.

3,992,977

PRODUCTION OF MULTIPLE GAUGE STRIP BY DRAW-SHAVING

Joseph Winter, New Haven; Eugene Shapiro, Hamden, and Warren F. Smith, Branford, all of Conn., assignors to Olin Corporation, New Haven, Conn.

Continuation-in-part of Ser. No. 462,851, April 22, 1974, abandoned. This application Dec. 19, 1975, Ser. No. 642,594
Int. Cl.² B23D 1/00
U.S. Cl. 90—24 R **13 Claims**



1. A method for the production of a multiple gauge metal strip product of rectangular cross section possessing regions of two or more variable thicknesses providing a generally stepped surface configuration, said method comprising determining the maximum possible stock removal per shaving pass in relation to the yield strength of said strip by measuring the amount of said stock removed up to the point where yielding of said strip occurs under tension, adjusting an apparatus for shaving said strip to remove approximately the maximum

possible stock in a single shaving pass without causing said metal strip to exceed its yield strength, drawing said strip while under back tension through the apparatus and shaving the strip whereby the surface thereof is reduced by an amount confined to an area comprising from approximately 5 to about 50 percent of total surface area, and the volume of strip material removed ranges from approximately 10 to about 60 percent as measured in relation to initial strip cross-sectional area.

3,992,978

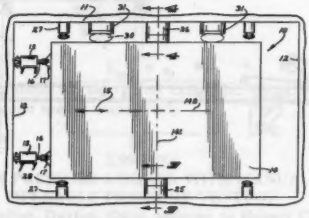
FLUID MOTOR AND FLUID CONTROL MEANS THEREFORE

Niel R. Petersen, Hopkins, Minn., assignor to MTS Systems Corporation, Minneapolis, Minn.

Division of Ser. No. 470,631, May 16, 1974, Pat. No. 3,921,286. This application June 23, 1975, Ser. No. 589,382

Int. Cl.² F15B *13/16, 9/10;* **F01B** *11/02*

U.S. Cl. 91—47 **1 Claim**



1. A constant position variable force fluid actuated cylinder having a piston for resisting deviations in position of a member exerting a force on and supported by said piston from a reference position comprising a source of fluid under pressure connected to said cylinder, a variable size drain means permitting reference flow therethrough from said source with said piston in said reference position, means responsive directly to movement of said piston to cause said drain means to change in size in response to changes in position of said piston with respect to said reference position, and means between said source and said cylinder to cause a fluid pressure change between said source of fluid under pressure and said cylinder when the drain means is varied in size by the changing position of the piston; said drain means including a member within said cylinder having a drain passageway therein, said drain passageway opening through an end of said member facing a surface of said directly responsive means, a spacing between said member end and said surface controlling the flow from said cylinder with said piston in said reference postion, said member defining said drain passageway being movably mounted in said cylinder for movement between first and second positions, fluid bias means moving said member toward said second position, said member being in said second position with the piston in the reference position.

3,992,979

HYDRAULIC ACTUATING ARRANGEMENTS

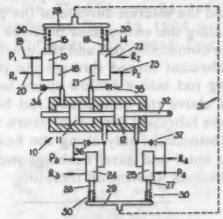
Charles Philip Smith, Wolverhampton, England, assignor to Joseph Lucas (Industries) Limited, Birmingham, England

Filed Dec. 20, 1974, Ser. No. 534,892

Int. Cl.² F15B *11/16;* **B64C** *13/42*

U.S. Cl. 91—413 **6 Claims**

1. A hydraulic actuator arrangement comprising a pair of double-acting actuator devices, said actuator devices being interconnected for movement in unison, first and second control valves each having independently movable control elements which are respectively operable to provide first and second pressure signals to drive one of said actuator devices in respective opposite directions, third and fourth control valves each having independently movable control elements which are respectively operable to drive the other of said actuator devices in respective opposite directions, means for moving said control elements, resilient means connecting said moving means with each of said control elements for normally



moving the latter in unison, means for applying a supply pressure to said valves and four relief valves for preventing said first, second, third and fourth pressure signals respectively from exceeding said supply pressure by more than a predetermined amount.

3,992,980

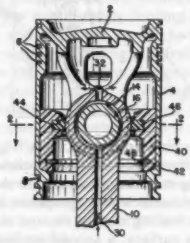
INTERNAL OIL SEAL FOR PISTON

Fred W. Ryan, Box 845, Seahurst, Wash. 98062, and Robert J. Webber, 23633 101st W., Edmonds, Wash. 98020

Continuation of Ser. No. 257,871, May 5, 1972, abandoned. This application Sept. 3, 1974, Ser. No. 502,356

Int. Cl.³ F01B *31/10;* **F16J** *1/04*

U.S. Cl. 92—157 **2 Claims**



1. In a hollow piston and connecting rod assembly for use in an internal combustion engine wherein the piston includes a head, a cylindrical skirt extending from the head and a pair of diametrically opposed, transverse bores extending through the skirt of the piston, wherein a connecting rod has a passageway therethrough for passage of lubricant and a bulbous portion at one end through which an annular bore extends, wherein a wrist pin extends through the bore of the connecting rod and is supported in the diametrically opposed bores of the piston, wherein inner bushing means are inserted in the bore of the connecting rod and around the wrist pin, providing a bearing surface between the inner surface of the bushing means and the wrist pin, wherein outer bushings, spaced from the terminating ends of the inner bushing means, are inserted in the bores extending through the skirt of the piston and around the wrist pin to provide a bearing surface between inner surfaces of the outer bushings and the wrist pin, the spaces between the inner and outer bushings providing lubricant passages so that lubricant forced under pressure through the passageway in the connecting rod lubricates the wrist pin and cools the piston head, the improvement comprising:

sealing means, including (1) segments on each side of the wrist pin conforming to the interior surface of the skirt of the piston and extending upwardly along the interior of

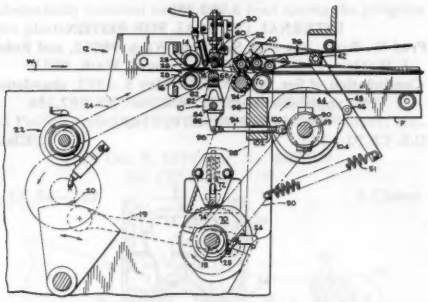
the skirt to a point laterally of the axis of the wrist pin and then laterally towards the wrist pin, (2) a groove formed in the portion of each segment facing the wrist pin, and (3) a wiping seal received in each of the grooves contacting the exterior surface of the bulbous portion of the connecting rod, the segments and wiping seals closing the entire area between the bulbous portion of the connecting rod and the interior surface of the piston, the sealing means sealing the entire area between the bulbous portion of the connecting rod and the inner walls of the skirt so that lubricant forced through the passageway in the connecting rod into a hollow space beneath the piston head and above the connecting rod builds up pressure therein, the lubricant forced to return below the sealing means substantially only along the bearing surfaces between the inner and outer bushings and wrist pin to provide continuous lubrication thereto.

3,992,981

WEB STRIPPING APPARATUS

David K. Stock, Green Bay, Wis., assignor to FMC Corporation, San Jose, Calif.

Filed Nov. 19, 1975, Ser. No. 633,528
Int. Cl.² B31B *1/16, 1/64*
U.S. Cl. 93—33 H **13 Claims**



1. A web stripping apparatus for a bag machine including intermittently driven draw rolls for cyclically advancing a web of thermosealing material along a path through a sealing station, the improvement which comprises a first sealing means disposed at the sealing station on one side of said path and having a sealing surface, a second sealing means disposed at the sealing station on the other side of said path and having a sealing surface, means for heating at least one of said sealing means to a bonding temperature, means for moving one of said sealing means in a direction substantially normal to said path between a position spaced from said path and a position in sealing engagement with the web, severing means on one side of said web movable into the web when the web is stationary for transversely severing the web, and means for momentarily moving the sealing surface of the other sealing means substantially parallel to said path when the web is stationary to strip the web from the sealing surface of said other sealing head.

3,992,982

FOLDING APPARATUS FOR CORRUGATED PAPERBOARD BLANKS

Martinus C. Huiskes, Almelo, Netherlands, assignor to Koppers Company, Inc., Pittsburgh, Pa.

Filed Feb. 11, 1975, Ser. No. 548,967
Claims priority, application Netherlands, Feb. 13, 1974, 7401947
Int. Cl.² B31B *1/38*
U.S. Cl. 93—52 **10 Claims**

1. Apparatus for folding and sealing paperboard blanks having scores and slots therein forming side panels on said blanks, comprising:

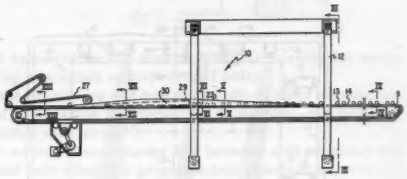
feeding means for feeding said blanks sequentially into said apparatus;

conveying means for advancing said blanks through said apparatus having a bottom folding means extending substantially the entire length of said apparatus and a top folding means extending along an upstream portion of said apparatus over said bottom folding means;

guiding means for laterally guiding said side panels of the blanks to be folded during advancement of said blanks through said apparatus between said top and bottom folding means; and

an alignment means at the outlet end of said apparatus for aligning the folded side panels on said blanks,

said bottom folding means including:



at least three parallel, horizontally aligned and laterally spaced conveyor belts each supported along its length by tubular support means having subatmospheric pressure therein, said tubular support means including perforated top portions across which perforated portions of said belts associated therewith are movable for directing said subatmospheric pressure to beneath portions of said blanks on top of said belts for firmly adhering said blanks to said belts during advancement of said blanks through said apparatus;

each of the outermost two of said belts including a longitudinally extending perforated portion maintained horizontally over said perforated top portions and a longitudinally extending non-perforated portion bendable around a longitudinal axis of said belts with respect to said perforated portions for guiding said side panels toward folding relationship with the remainder of said blanks.

3,992,983

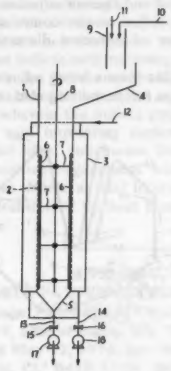
PREPARATION OF TEA EXTRACTS

Rupert Josef Gasser, and Steven N. Watercutter, both of Marysville, Ohio, assignors to Societe d'Assistance Technique pour Produits Nestle S.A., Lausanne, Switzerland

Filed Dec. 5, 1973, Ser. No. 421,852
Int. Cl.² A47J *31/00*
U.S. Cl. 99—287 **10 Claims**

1. Apparatus for preparing tea extract which comprises means for enclosing a first space, means for feeding an aqueous tea slurry to said first space, means for enclosing a second space adjacent said first space, said first space having a volume of about 0.5 to 2.5 times that of said second space, means for feeding an extraction liquid to said second space, said first space enclosing means including wall structure separating said first and second spaces, said wall structure being provided with openings communicating said first space with said second space, said openings being of a size sufficient to permit tea soluble solids to pass through said wall structure from the aqueous tea slurry in said first space into extraction liquid in

said second space but insufficient to permit tea insolubles to pass from said first space to said second space, and means for



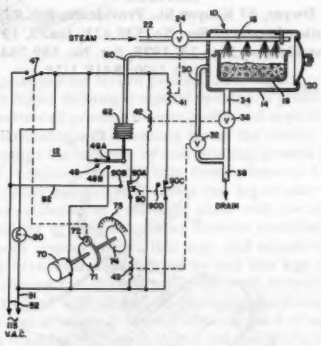
removing aqueous tea slurry and extraction liquid from said first and second spaces respectively.

3,992,984

STEAM PRESSURE COOKER WITH MANUALLY OPERABLE PRESSURE VENTING

Fritz F. Treiber, Dayton, Ohio, assignor to Hobart Corporation, Troy, Ohio

Filed Nov. 14, 1975, Ser. No. 631,829
Int. Cl.² A47J *27/04*
U.S. Cl. 99—330 **5 Claims**



1. In a steam pressure cooker including a closed pressure vessel; an inlet connected to a source of pressurized steam; an exhaust and drain system including a drain pipe connected to the bottom of said vessel and having a valve therein through which is drained liquids and/or food particles, a separate restricted exhaust pipe connected to said vessel and having a separate valve therein; and automatic control means controlling said valves to regulate flow of steam into and out of said vessel whereby foods can be automatically defrosted, preheated, and cooked,

the improvement in said exhaust and drain system comprising:

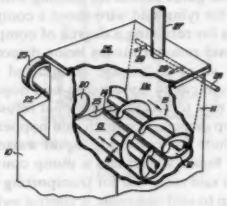
manually operable means independent of said control means and connected to open said restricted exhaust means whereby said cooker can be depressurized independently of the status of said automatic control means.

3,992,985

APPARATUS FOR PROCESSING MEAT MATERIAL WITH CARBON DIOXIDE

Archie Rae McFarland, Salt Lake City, Utah, assignor to Beehive Machinery Inc., Salt Lake City, Utah

Continuation of Ser. No. 429,838, Jan. 2, 1974, which is a division of Ser. No. 274,574, July 24, 1972, Pat. No. 3,825,231. This application Sept. 15, 1975, Ser. No. 613,084
Int. Cl.² A22C *5/00*; B01F *7/08*
U.S. Cl. 99—478 **12 Claims**



1. Apparatus for processing meat with carbon dioxide, comprising a mixing vessel of hopper configuration normally closed by a separate, top cover; mixing conveyor screws arranged side-by-side in fixed relationship at the bottom of the vessel for mixing meat introduced into the vessel and for discharging mixed meat from the vessel; means whereby meat may be continuously fed into the closed vessel above said mixing screws; a discharge outlet in a wall of the vessel in substantial alignment with one of the screws at one end thereof, said one screw being arranged to convey meat and to force it through the discharge outlet; means for rotating the screws; and means for continuously feeding carbon dioxide into the vessel near and along the top of the hopper interior of the vessel, said means comprising a plurality of flow passages extending into the vessel from the exterior thereof so that discharge therefrom is located at or near and along the top of said hopper interior of the vessel, said hopper interior of the vessel being open and unobstructed from the location of discharge of said flow passages to said mixing screws, whereby meat introduced into said vessel will fall freely into said mixing screws and carbon dioxide introduced into said vessel through said flow passages will fall freely with and onto said meat as the mixing screws operate below the free-fall hopper interior of said vessel.

3,992,986

APPARATUS FOR COLLECTING AND DISPOSING OF REFUSE

William H. Sutton, 7400 Smithfield Road, Fort Worth, Tex. 76118

Filed May 28, 1975, Ser. No. 581,637
Int. Cl.² B65B *13/20*; B30B *15/22*, *15/32*
U.S. Cl. 100—7 **1 Claim**

1. A combination for collecting and disposing of refuse comprising:

a. a plurality of portable baling units, each including:

i. first means for traversing along respective predetermined route segments;

ii. second means for collecting and baling refuse as said portable baling unit traverses along its respective route segment; said second means being connected with said first means; and

iii. third means for periodically discharging bales of refuse; said third means being responsively connected with said second means and separably operable;

said second and third means comprising a hopper collector, a ram cavity therebeneath, a ram compaction chute, a ram that is movable longitudinally of said ram cavity and said compaction chute, a compaction gate for closing over the end of said compaction chute for forming a bale, a reciprocally movable hood that is connected with said ram so as to move reciprocally therewith and protect said ram by preventing refuse from falling thereinto behind said ram during a compaction stroke of said ram; wire guide means for guiding wire for encompassing a bale and for tying said wire about a compacted said bale; retainer means for retaining a degree of compaction achieved by said ram; said retainer means being disposed in said compaction chute so as to engage compacted refuse before it reenters said ram cavity underneath said hopper on the backstroke of said ram to receive additional refuse; a liquid waste collection sump disposed beneath said hopper, ram cavity and compaction chute for collecting liquid waste; a reservoir for receiving said liquid waste; and a pump connected with said sump and with said reservoir for transporting said liquid waste from said sump to said reservoir; a control switch; said control switch being operable to automatic position to effect automatic operation, automatically effecting retraction of said ram and closure of said compaction gate to start a particular route segment and refuse collection; a photoelectric sensor unit with beam in said ram cavity for monitoring the degree of refuse collection effected including a timing unit for monitoring the breaking of said beam for a predetermined time interval to indicate refuse stacked beyond a certain level and to signal automatic compaction stroke of said ram; ram moving means for effecting a compaction stroke of said ram; said ram moving means being connected responsively with a power unit and said photoelectric sensor unit; first limit switch means for limiting movement of said ram on said compaction stroke and effecting retraction of said ram; said first limit switch means being drivingly connected with said ram moving means; whereby compaction cycling continues automatically until a predetermined force is reached; compaction force measuring means for measuring when said predetermined compaction force is reached on compaction of said refuse means for advising an operator to complete a bale when said compaction force is reached; means for opening said compaction gate; means for extracting a bale after it has been pushed from said compaction chute by compaction of refuse thereagainst a predetermined distance; second limit means for measuring when said bale is moved a predetermined distance satisfactory for activating the extracting means and when the bale is extracted from beneath the compaction gate for closing the compaction gate; said second limit means being connected with said compaction gate closing means and said extracting means; and

b. a transport unit that picks up said bales of refuse discharged by said portable baling units and delivers said bales to a sink;

whereby said transport unit with only a few trips to a refuse sink can serve said plurality of portable baling units, without requiring many trips by said plurality of portable baling units, each with a plurality of personnel.

3,992,987

BELT GUIDE ROLLER FOR BALERS

Joseph F. Sereg, Box 156, Rte. No. 2, Eddyville, Iowa 52553

Filed Aug. 25, 1975, Ser. No. 607,296

Int. Cl.² B30B *5/06*

U.S. Cl. 100—88 **2 Claims**

1. In combination,

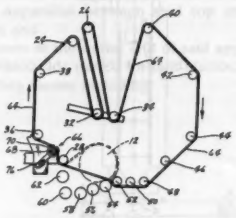
a baler including a frame means having front, top, back and bottom portions,

a plurality of spaced-apart belts extending around said frame means,

a belt drive roller mounted on said frame adjacent its lower forward end,

a belt guide roller means mounted on said frame means at the lower forward end thereof adjacent said drive roller, said belt guide roller means comprising an elongated continuous roller of constant diameter engaging said belts, and

said belt guide roller means being adjustably mounted on said frame means for permitting said roller means to be



selectively rigidly secured to said frame means to permit the pressure on said belts to be selectively adjusted,

said frame having a bale forming portion adjacent one side of said drive roller, and said belt guide roller being located on the other side of said drive roller opposite to said bale forming portion, and being positioned above and forwardly of said drive roller,

a plurality of spaced-apart annular guide members rigidly secured to said roller and being positioned between adjacent belts.

3,992,988

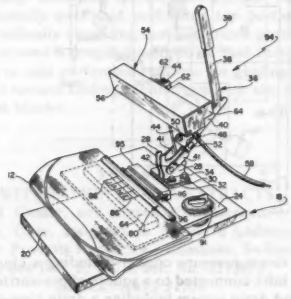
DEVICE FOR IMPRINTING INDICIA ON A FLEXIBLE ARTICLE

James F. Dwyer, 47 Kenyon St., Providence, R.I. 02903

Continuation-in-part of Ser. No. 538,421, Jan. 3, 1975. This application June 23, 1975, Ser. No. 589,784

Int. Cl.² B44B *5/00;* **B41F** *1/28*

U.S. Cl. 101—9 **7 Claims**



1. A device for imprinting indicia on a flexible article, comprising a base, a resilient pad mounted on said base for receiving an article thereon and defining an imprinting station, a stop mounted on said base adjacent to said pad for locating said article in oriented imprinting position at said imprinting station, said indicia being deposited on individually, preformed indicia strips and being heat responsive for transfer onto an article in contact therewith, a combined stop and holder member removably mounted on said stop, said holder member being formed with an upper wall, a lower wall spaced from said upper wall in parallel relation thereto and a longitudinally extending element joined to said upper and lower walls

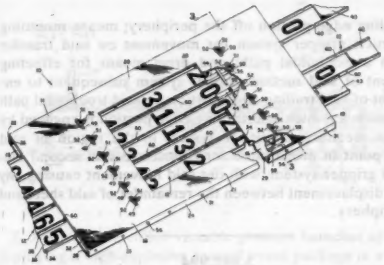
and fixed therebetween for locating said walls in spaced apart relation, said longitudinally extending element separating the walls to form a space therebetween which defines a longitudinally extending slot, the depth of said slot being of predetermined dimension for receiving an article in frictional relation therein, wherein the article is properly oriented for the imprinting operation when the holder member is mounted on said stop, and an indicia strip retaining member for receiving selected indicia strips therein and being mountable in overlying relation on said holder when the article is located in a slot of said holder, wherein the indicia strips are positioned over said article at said imprinting station, a heating member mounted on said base, and means for moving said heating member into positive engagement with said printed indicia that overlies said article at said imprinting station, wherein said indicia is transferred by heat from sid heating member onto said article.

3,992,989

VARIABLE PATTERN SCREEN PRINTER

Hugh L. Thompson, P.O. Box 2329, and George A. Wendlend, P.O. Box 1019, both of Waco, Tex. 76703

Filed May 12, 1975, Ser. No. 576,620
Int. Cl.² B41F *15/34;* **B41J** *3/22*
U.S. Cl. 101—112 **8 Claims**



8. Apparatus for screen printing on a surface comprising a support frame defining a central opening, a plurality of elongated patterned printing screens positioned in parallel side-by-side relationship and extending across the central opening of said support frame, each of said printing screens including a pair of rectilinear parallel side frame elements L-shaped in cross section and oriented with a first leg of each side frame element extending in a common plane with one another and a second leg of each side frame element extending at a right angle with respect to said first legs, and screen material extending between and supported by said first legs of said side frame elements, U-shaped guide elements supported by said support frame with said guide elements extending about the second legs of said side frames whereby each of said printing screens is movable along its length independently of the other screens in said support frame to move different portions of its pattern into the opening of said support frame.

3,992,990

DYESTUFF APPLICATOR FOR SCREEN PRINTER

Peter Zimmer, Untere Sparchen 54, Kufstein, Austria

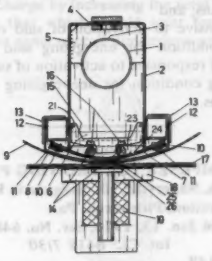
Continuation of Ser. No. 376,714, July 5, 1973, abandoned. This application June 2, 1975, Ser. No. 582,925
Claims priority, application Austria, Aug. 1, 1972, 6651/72
The portion of the term of this patent subsequent to Nov. 25, 1992, has been disclaimed.
Int. Cl.² B41F *15/42*
U.S. Cl. 101—120 **8 Claims**

1. A dyestuff applicator for a printer provided with an apertured screen rotatable about a horizontal axis, comprising:

a supply tube parallel to said axis provided with at least one exit port for liquid dyestuff;

a casing surrounding said tube and supported thereon, said casing being provided with an open bottom overlying an inner screen surface;

an elastic membrane secured to said casing and spanning said open bottom while curving downwardly toward said screen surface in two vertical planes including said axis and transverse thereto, respectively, said membrane being provided with an outlet for said dyestuff in an axially extending median zone; and



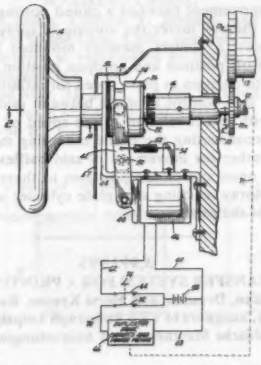
a relatively rigid foil secured to said casing and interposed between said membrane and said screen surface, said foil having a cylindrical curvature substantially conforming to that of said screen surface and contacting said membrane along said median zone, said foil having openings registering with said outlet for the passage of dyestuff through apertures of the screen to an underlying substrate to be imprinted.

3,992,991

NON-ROTATING HANDWHEEL

Robert M. Koch, Wheaton, Ill., assignor to Addressograph Multigraph Corporation, Cleveland, Ohio

Filed June 19, 1975, Ser. No. 588,303
Int. Cl.² B41L *17/22*
U.S. Cl. 101—132 **2 Claims**



1. A rotary duplicator comprising:

a rotary printing cylinder;

power means including a rotary shaft for driving the cylinder;

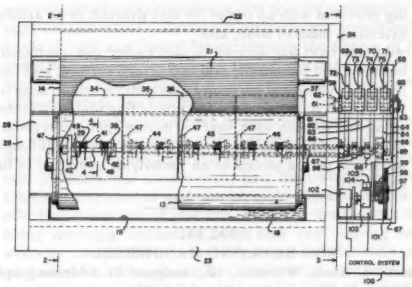
a handwheel rotatably mounted adjacent said shaft;
clutch means continuously drivingly connected to said handwheel and shiftable into and out of driving engagement with said shaft;
control means for starting and stopping the power means;
spring means urging said clutch means towards driving engagement with the shaft;
electromagnetic means for moving said clutch means to a position out of driving engagement with the shaft and holding the same in such position in opposition to said spring means; and
means responsive to activation of said control means to starting condition for energizing said electromagnetic means, and responsive to activation of said control means to stopping condition for deenergizing said electromagnetic means.

3,992,992

DAMPENER FOR PRINTING PRESS

Walter S. Smith, Naperville, Ill., assignor to Rockwell International Corporation, Pittsburgh, Pa.

Filed Jan. 13, 1976, Ser. No. 648,797
Int. Cl.² B41F *7/30*
U.S. Cl. 101—148 **7 Claims**



1. Mechanism for dampening a plate on the plate cylinder of a printing press comprising means for generating and directing a liquid spray of dampening fluid toward said plate cylinder, a series of baffles located between said spray generating means and said plate cylinder, means mounting said baffles for movement between a closed position and an open position to thereby meter the volume of spray reaching said plate cylinder, a control member mounted for movement between an off position and an open position, power means responsive to changes in press speed for infinitely varying the position of said control member between said off and open positions with direct relation to the speed of the press, and means interconnecting the baffle mounting means with said control member for movement of said baffles therewith between said open and closed positions to thereby control the volume of spray reaching said plate cylinder with relation to the speed of the press.

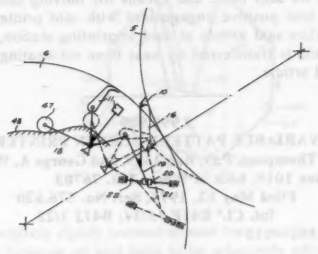
3,992,993

SHEET TRANSFER SYSTEM FOR A PRINTING MACHINE

Wilfried Kühn, Dresden, and Horst Krause, Radebeul, both of Germany, assignors to VEB Polygraph Leipzig Kombinat fur Polygraphische Maschinen und Ausrustungen, Leipzig, Germany

Filed Mar. 25, 1975, Ser. No. 561,675
Int. Cl.² B41F *21/06*
U.S. Cl. 101—409 **4 Claims**

1. In a printing machine, a combination comprising an upstream and a downstream printing station each having a printing roller; a sheet transfer roller between said stations for transferring sheets from the printing roller of said upstream station to the printing roller of said downstream station, said sheet transfer roller defining a tangent point with the printing roller of said upstream station; a first and a second mechanical gripper system on said transfer roller, mounted for swinging movement towards and away from one another; a suction gripper system on said transfer roller; actuating means for effecting engagement of said suction gripper system with a trailing edge portion of a sheet on the periphery of the printing roller of said upstream station prior to arrival of said trailing edge portion at said tangent point, and for effecting lifting of



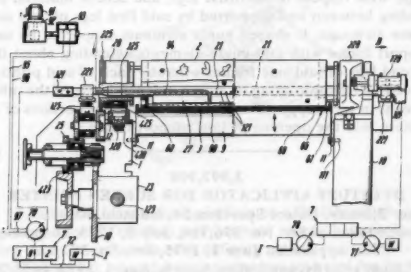
said trailing edge portion off the periphery; means mounting said suction gripper system for movement on said transfer roller in a trochoidal path; and drive means for effecting movement of said suction gripper system subsequent to engagement of said trailing edge portion, in said trochoidal path to a position at which said trailing edge portion is engaged by said first mechanical gripper system in the region of said tangent point in preparation for transfer to said second mechanical gripper system, with out said movement causing any relative displacement between the remainder of said sheet and said periphery.

3,992,994

SCREEN PRINTER WITH CLEANING MEANS AND MEANS TO CONTROL RUNOFF

Mathias Mitter, Verl, Germany, assignor to Mitter & Co., Schloss Holte, Germany

Filed Jan. 7, 1975, Ser. No. 537,995
Claims priority, application Germany, Jan. 8, 1974, 2400728
Int. Cl.² B41F *35/00, 15/18*; B45G *15/40, 15/62*
U.S. Cl. 101—425 **28 Claims**



1. In a printing machine, particularly in a screen printing machine, a combination comprising a printing station having components which require intermittent cleaning due to fooling by the printing ink; an endless driven printing blanket trained about a first and a second reversing roller which are spaced lengthwise of the machine from said printing station,

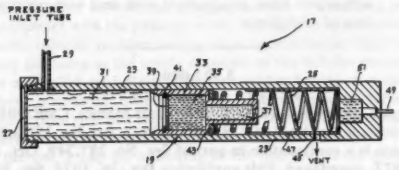
in upstream and downstream direction, respectively, said printing blanket having an upper run extending beneath said printing station and carrying the workpiece to be printed, and said upper run being inclined downwardly with respect to the horizontal from substantially said first reversing roller to said second reversing roller; cleaning means upwardly of said upper run for at times discharging a cleaning liquid into said printing station to clean said components and run off onto said upper run of said printing blanket; and liquid intercepting means extending along the respective lateral edge portions of said upper run at least intermediate said printing station and said second reversing roller, so that cleaning liquid which is discharged into said printing station and runs off onto said upper run will be confined thereon by said liquid intercepting means and be constrained to run off in a predetermined direction due to the inclination of said upper run.

3,992,995

SPEED CONTROLLED SECOND EVENT LAUNCHER

Arne H. Wiedermann, Chicago Heights, Ill., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Sept. 4, 1975, Ser. No. 610,465
Int. Cl.² F42B *25/00*
U.S. Cl. 102—7.2 **4 Claims**



1. A speed controlled variable position launcher system for deploying a high explosive second event package in a detonable fuel-air-explosive (FAE) cloud formed after the bursting of an FAE device, said variable position launcher comprising, an elongated hollow launch tube for attachment to the FAE device, said launch tube having an explosive cavity at one end and a muzzle at the other end, an explosive charge positioned in the explosive cavity of said launch tube, a second event (SE) package slidably positioned in the central portion of said launching tube, a positioning spring disposed in said launch tube between said SE package and the explosive cavity end, said spring operating to urge said SE package toward the muzzle end of said launch tube, a pressure tight frangible cover positioned over the muzzle end of said launch tube, and means for pressurizing the area between said SE package and the muzzle end of said launch tube such that the position of the SE package is dependent on the relationship between the forces exerted by the pressure and by the positioning spring thereby positioning the SE package in a predetermined location in the launch tube to allow launching at the proper velocity and cause the FAE cloud to be detonated when the SE package explodes.

3,992,996

PROJECTILE WITH DELAYED BURSTING EFFECT

Kåre Roald Strandli, Raufoss, Norway, assignor to A/S Raufoss Ammunisjonsfabrikker, Raufoss, Norway

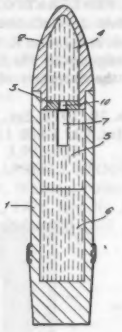
Filed May 17, 1974, Ser. No. 471,149
Claims priority, application Norway, May 18, 1973, 2067/73
Int. Cl.² F42B *13/12, 13/14*
U.S. Cl. 102—56 R **4 Claims**

1. An elongated projectile of the type wherein the bursting effect is delayed following impingement of the front of the projectile against a target, comprising:

a bursting charge of a relatively low sensitivity,

an incendiary charge arranged in front of the bursting charge, said incendiary charge being capable of burning through in a predetermined time, upon impingement of the projectile against a target, until it ignites the bursting charge,

and means defining at least one hole extending longitudinally into the incendiary charge from the forward end thereof for increasing the intensity of burning of the incendiary charge by increasing the total burning surface area above that which would exist for an incendiary charge of the same overall dimensions without said hole,



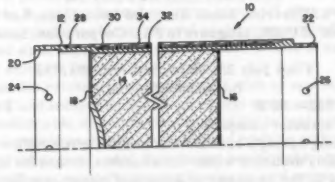
so that the said predetermined time of burning through of the incendiary charge with a said hole is less than the burning through time for an incendiary charge with the same overall dimensions and same burning rate composition and compression but without a said hole, and wherein the bursting charge has a sensitivity selected for cooperation with the said length and burning rate composition and compression of the incendiary charge with a hole which is less than would be required for use with an incendiary charge which burned through to ignite the bursting charge in the same said predetermined time but did not include a said hole.

3,992,997

WARHEAD CASING

Melvin J. McCubbin; Clifford T. Johnson, and Curtis V. Nakaishi, all of China Lake, Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Mar. 31, 1975, Ser. No. 563,748
Int. Cl.² F42B *15/00, 13/12*
U.S. Cl. 102—56 R **6 Claims**



1. In a thermal insulation system in combination with a missile skin or the like for the protection of explosive material in the warhead section of the missile from the effects of aerodynamic heating or open fires, the combination comprising:

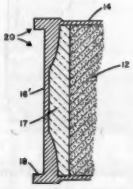
a substantially cylindrical web of metal forming a warhead casing;

said casing being centrally relieved or recessed in steps forming inner and outer areas between steps;
an inner layer of insulative material filling the inner area next to said metal casing; and
an outer layer of fire resistant material filling said outer area between steps;
the system being so constructed and arranged that the warhead section as a whole presents an outer surface coincidental in dimensions with the outer skin of the remainder of the missile.

3,992,998
WARHEAD, PENETRATING NOSE SHAPE

Paul E. Cordle; Melvin J. McCubbin, both of China Lake; Clifford T. Johnson, and James K. Brown, both of Ridgecrest, all of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Feb. 10, 1975, Ser. No. 548,725
Int. Cl.² F42B *13/12*
U.S. Cl. 102—56 R **4 Claims**



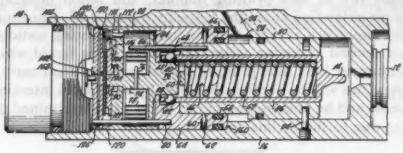
1. A penetration warhead comprising in combination:
a substantially cylindrical metal casing having forward and rearward metal end walls;
an explosive material within said casing between said end walls;
said forward end wall being imperforate and formed integrally with said casing and having a substantially flat forward face and a contoured inner surface;
the central portion of said inner surface being substantially flat and spaced from said forward surface by a relatively normal thickness of metal;
said inner surface contour surrounding said central portion being such that the portion of said end wall surrounding said central portion is thickened gradually from said central portion outward to said casing; and
a relatively thick contoured shock pad fitted between said inner surface and the forward end of said explosive material.

3,992,999
CONTROLLED ACTUATOR

Francois X. Chevrier, Santa Ana, and Leon Jones, Los Alamitos, both of Calif., assignors to FXC Corporation, Santa Ana, Calif.

Filed July 25, 1974, Ser. No. 491,733
Int. Cl.² F42C *5/02*
U.S. Cl. 102—70 B **7 Claims**

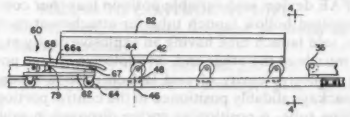
1. An actuator comprising
a housing having a chamber formed therein, a hollow piston slidably mounted within the chamber, means for applying fluid to the chamber to drive said piston in a first direction,
a hollow hammer mounted within said piston for slidable motion relative thereto,
a drive spring mounted within said hammer and bearing at one end thereof against one end of the hammer,
said piston having a cocking arm in driving engagement with the other end of said spring,
latch means movably mounted in said housing for opposing the force exerted by said drive spring to releasably restrain motion of said hammer, said latch means comprising
a sear pivotally mounted to said housing for motion between a first position in which it restrains slidable motion of said hammer and



a second position in which it releases said hammer to be driven by said drive spring when the latter is compressed by the piston,
a spring connected to urge said sear to said second position thereof, and
a retractable control element engaging the sear to restrain motion thereof to said second position, said control element being fixed to the piston and adapted to be withdrawn from engagement with said sear upon motion of said piston.

3,993,000
FREIGHT PUSHING DEVICE

Clyde L. Sherwood, 1021 12th St., Santa Monica, Calif. 90403

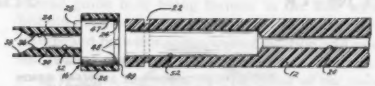
Division of Ser. No. 414,318, Nov. 9, 1973, Pat. No. 3,872,963, which is a continuation-in-part of Ser. No. 297,349, Oct. 13, 1972, abandoned. This application Dec. 26, 1974, Ser. No. 536,483
Int. Cl.² B61J *3/06*
U.S. Cl. 104—176 **6 Claims**

1. A push apparatus adapted to engage a freight load and push it along a conveying path, said apparatus comprising:
a. a base member adapted to be moved along a conveying path,
b. a push arm means having a first raised load engaging position and a second lower load release position, said push arm means presenting when in its raised load engaging position an upwardly facing moderately sloping load engaging surface for non-abrupt engagement of a freight load, and movable to its second position in a direction away from a freight load engaged by said load engaging surface,
c. releasable arm holding means having a hold position to engage said arm means and hold it in its first load engaging position so as to enable said arm means to exert a pushing force against said freight load, said holding means being selectively releasable under load to permit said arm means to move to its second position in response to a resisting force of a freight load against said arm means, and
d. arm positioning means engaging said arm means to urge said arm means with moderate force to its raised position in the direction toward a freight load engaged by said load engaging surface so as to come into holding engagement with its holding means,

whereby with said arm holding means in its hold position, said push arm means is able to engage a load to move the load along a path, and with said arm holding means in its release position, said push arm means can be depressed by a resisting force of the load to its release position to be able to pass beneath the load, after which the arm positioning means is able to return the push arm means to its raised load engaging position with the arm holding means returning to its hold position.

3,993,001
EXPLOSIVE EXPANSION MEANS FOR ATTACHING TUBES TO TUBE SHEETS

Frederick L. Hawes, Ladue, Mo., assignor to Tetra Plastics, Inc., Chesterfield, Mo.

Filed Aug. 18, 1975, Ser. No. 605,457
Int. Cl.² F42B 3/00
U.S. Cl. 102—24 R **21 Claims**

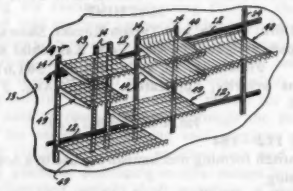


1. Means for explosively expanding outwardly a portion of a tubular member positioned extending through a passage in a wall member so that the tubular member moves into intimate contact with the passage in the wall member, comprising a plastic tubular member having an outside diameter approximately the same as the inside diameter of the tubular member to be expanded, said plastic tubular member having an outside surface, a counter bore extending into the plastic tubular member from one end thereof, a groove formed in the outside surface of the plastic tubular member adjacent to the said one end thereof, a cap for attaching to the one end of the plastic tubular member, said cap having an annular wall portion with an inside diameter approximately the same as the outside diameter of the plastic tubular member, means on said annular cap wall engageable with the groove when the cap is installed, and a smaller diameter tubular cap portion including means connecting said smaller diameter tubular portion to the annular cap wall.

3,993,002
SHELVING STRUCTURE

Alvin L. Stroh, 9409 Downey Ave., Downey, Calif. 90240

Filed Aug. 28, 1975, Ser. No. 608,527
Int. Cl.² A47B 9/00
U.S. Cl. 108—108 **8 Claims**

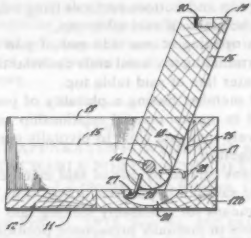


1. A shelf structure comprising:
a pair of horizontally extending hangbar members fixedly securable to a supporting wall in a spaced relationship,
a pair of upright members, each said upright members having a front wall with vertically spaced apart openings,
means including elements slideably engaging said hangbar members for adjustably securing said pair of upright members on said pair of hangbar members in spaced relationship,
a plurality of wire shelves, each wire shelf having side elements,
a pair of supporting brackets for each of said wire shelves, each said bracket having an inner end with lugs means thereon and a narrower outer end, and
a pair of clamps for each said bracket, each said clamps having a flat lower portion and a curved upper portion and including threaded fastening means for fastening said flat portion to the bracket, said curved upper portions of said clamps being disposed below the upper edges of said brackets and hingedly holding the side elements of a wire shelf against the faces of said brackets when said fastening means are tightened,
whereby each wire shelf can be detachably secured to the upright members at a selected vertical level by pivoting the brackets on the side elements thereof from a position flush against the underside of said shelf to a vertical position and inserting the lug means on the inner ends of said brackets into selected openings on the front walls of said upright members.

3,993,003
COLLAPSIBLE STOOL

Joseph W. James, 501 W. Whiting, Fullerton, Calif. 92632

Filed Aug. 11, 1975, Ser. No. 603,545
Int. Cl.² A47B 3/00
U.S. Cl. 108—112 **3 Claims**

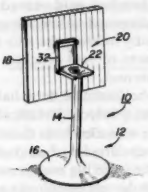


1. A collapsible stool comprising:
a plurality of elongate, rigid slats positioned in side-by-side, parallel relationship;
means for interconnecting adjacent slats, said means permitting said slats to be positioned in a coplanar array with the side edges of each slat contacting the respective side edges of adjacent slats and to be positioned in a collapsed position
a pair of elongate arms;
means for pivotably connecting first ends of said arms to the bottom surfaces of the outer slats of said array of slats, at opposite corners thereof, said arms being positionable in first positions, parallel to said slats, so as to be positionable in said collapsed position with said slats, said arms being positionable in second positions, perpendicular to said slats, adjacent the opposite ends of each of said slats;
four elongate legs;
means for pivotably connecting first ends of said legs to the first and second ends of each of said arms, said legs being positionable in first positions, parallel to said arms, so as to be positionable in said collapsed position with said slats and said arms, said legs being positionable in second positions, generally perpendicular to said arms, for supporting said slats above a support surface; and
means for automatically locking said second ends of said arms to said outer slats of said array when said arms are in said second positions and said legs connected to said second ends of said arms are pivoted to said second positions.

3,993,004
REMOVABLE AND TILTABLE TABLE TOP

Allyn C. Alme, Elgin, Ill., assignor to Johnson Industries, Elgin, Ill.

Filed Dec. 11, 1974, Ser. No. 531,455
Int. Cl.² A47B *3/00*
U.S. Cl. 108—124 **7 Claims**



1. In a table of the type having a base and a central upstanding post supporting a table top thereon, the improvement residing in the means mounting said table top to said post and comprising

a first member fixedly secured to said post and centrally disposed on the top thereof,

a second member fixedly secured to the bottom of said table top in such manner as to rest on said first member when said table top is in a substantially horizontal position,

said second member having a plurality of parallel slots having top and bottom surfaces lying substantially parallel to the plane of said table top,

said slots opening at one side end of said second member and terminating in closed ends a substantial distance from the center line of said table top,

said first member having a plurality of pintle portions arranged in mutual coaxial relationship and extending respectively into said slots to pivotally connect said members together,

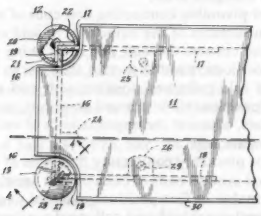
latch means carried by one of said members for releasably holding said pintle portions in said slots, and

locking means for releasably locking said first and second members in mutually juxtaposed positions with said second member resting on said first member.

3,993,005
TABLE LEG AND SUPPORTING STRUCTURE

Alan C. Burr, East Norwalk, Conn., assignor to Howe Furniture Corporation, New York, N.Y.

Filed Sept. 8, 1975, Ser. No. 611,131
Int. Cl.² A47B *3/06*
U.S. Cl. 108—156 **3 Claims**

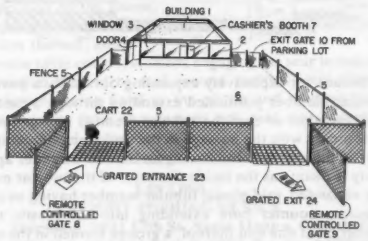


3. A table construction comprising in combination, a flat table top, a plurality of tubular legs each having a sidewall defining, in cross section, a continuous closed curve, means forming a right angular recess of predetermined dimension within each of said legs in proximity to one end thereof with the apex edge of said recess forming means positioned inwardly of said sidewall, a plurality of elongated flange members of width corresponding to said predetermined dimension, pairs of said flange members having one end of each inserted into the angular recesses of each of said legs, said flange ends in abutting engagement one with another within said angular recesses, a screw mounting hole passing through said abutting flange ends normal to the axis of said legs, screw means passing through said mounting hole into threadable engagement with said right angular recess forming means whereby when said screw means is tightened said flange ends are drawn into firm engagement with said angular recess forming means, and means on each of said flange members for securing the same to the underside of said flat table top.

3,993,006
STORE SECURITY SYSTEM

Timothy J. Connolly, Vallejo, Calif., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Jan. 27, 1975, Ser. No. 544,115
Int. Cl.² E05G *5/00*
U.S. Cl. 109—1 R **2 Claims**



1. A store security system for a store in a building having a wall with a window and a door therein, said security system comprising.

a steel fence extending from the building and enclosing a parking area extending from the wall having the window and the door, said fence having gates therein;

a bulletproof cashier's booth on the wall overseeing the fenced enclosure;

control means electrically connecting the cashier's booth and the door and gates for remote control of the door and gates from the cashier's booth;

a direct signal line from the booth to a Police Station; and

cart holding means at the gate for discouraging the theft of shopping carts.

3,993,007
STITCH FORMING MECHANISM OF A SEWING MACHINE

Atsuo Ohira, Toyota, and Tatsuo Kozaki, Showa Chiryu, both of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Japan

Filed Aug. 29, 1974, Ser. No. 501,613
Claims priority, application Japan, Aug. 31, 1973, 48-102983
Int. Cl.² D05B *57/14*
U.S. Cl. 112—184 **2 Claims**

1. A stitch forming mechanism for use in a sewing machine, comprising:

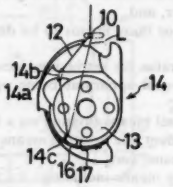
a needle vertically reciprocable by actuation of a thread take-up means;

a pair of upper and lower threads for forming a seam on a cloth by crossing each other;

a shuttle body rotatable in a horizontal plane by actuation of a supporting shuttle shaft and having a hook for engaging a loop of the upper thread; and

a cylindrical bobbin case disposed in said shuttle body and having a bobbin therein for supplying the lower thread therefrom, an upper thread guide portion being provided

on said bobbin case for slidably guiding the loop of the upper thread for crossing the same over the lower thread, a recessed portion being defined within said bobbin case so as to facilitate supply and withdrawal of said lower thread from said bobbin to said needle, and a lower



thread guide hole being formed in the side wall of said bobbin case below said upper thread guide portion and interposed between said recessed portion and said needle for guiding the lower thread withdrawn from the bobbin so as to place the lower thread ahead of the needle with respect to the rotational direction of the shuttle body.

3,993,008

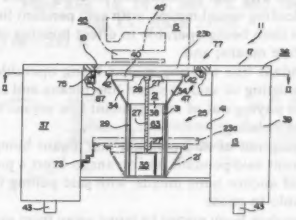
POWER LIFT FOR A SEWING MACHINE HEAD

Joe T. Parsons, Sr., 1200 W. Hale, Osceola, Ark. 72370

Filed Nov. 24, 1975, Ser. No. 634,924

Int. Cl.² D05B *75/02*

U.S. Cl. 112—217.1 **14 Claims**



1. In a sewing machine of the type having a desklike cabinet, a concealable sewing machine head, and a horizontally disposed work surface provided with a head opening through which the sewing machine head may freely be passed; the improvement which comprises a carriage assembly including a platform having a size and shape complementary with said head opening for restingly supporting thereon the sewing machine head, said carriage assembly being movable between a concealed/stowed position beneath said work surface and at least one working position wherein a cooperative association of said sewing machine head and said work surface is established, and platform stabilizing/motive means for guidingly constraining said carriage assembly through the movement thereof and for selectively driving said carriage assembly between said concealed/stowed position and said working position; said platform stabilizing/motive means including a plurality of elongated upright shaft members, a plurality of restraining members for restrainedly coupling said carriage assembly with said respective plurality of shaft members, at least one of said shaft members being provided with external threads substantially along the length thereof, at least one of said restraining members being provided with an internally threaded bore for threadedly engaging said externally threaded shaft member, and drive means coupled to said threaded shaft member for selectively causing said threaded shaft member to be rotated about the longitudinal axis thereof thus driving said carriage assembly between said concealed/-stowed position and said working position.

3,993,009

PRESSER FOOT SEWING MACHINES

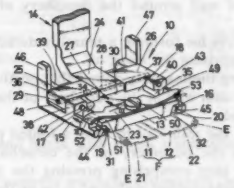
Tatsuo Osaki, Uozu, Japan, assignor to Yoshida Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 9, 1975, Ser. No. 620,935

Claims priority, application Japan, Oct. 12, 1974, 49-117259

Int. Cl.² D05B *29/00*

U.S. Cl. 112—235 **6 Claims**



1. A presser foot for sewing to a garment a slide fastener having two rows of fastener elements mounted on respective carrier tapes, comprising in combination:

a. a foot portion pivotally mounted on a presser bar;

b. a gripping member mounted on said foot portion and cooperating with the latter in forming a guiding groove for receiving and guiding one of the rows of tape-mounted fastener elements; and

c. a spring member secured to said foot portion and engaging with said gripping member to normally bias the latter toward said foot portion in a direction to narrow said guide groove.

3,993,010

PROCESS AND APPARATUS FOR FORMING REARABLY DETACHABLE PORTION ON SHEET

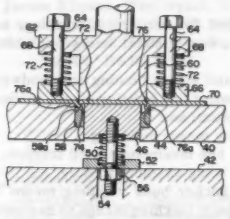
Keiji Taniuchi, No. 6-7,2-chome, Nishi-Koujiya, Ohta, Tokyo, Japan

Filed Feb. 21, 1975, Ser. No. 551,591

Claims priority, application Japan, July 4, 1974, 49-75868; Aug. 14, 1974, 49-92297

Int. Cl.² B21D *51/38*

U.S. Cl. 113—121 C **11 Claims**



1. Apparatus for forming a tearably detachable portion on a sheet comprising:

first die means having the shape of the periphery of the tearably detachable portion;

second die means formed with first and second axially extending bores, said first axially extending bore being conjugate to the shape of said first die means;

a ring-like member disposed in said first axially extending bore of said second die means and having a continuous ridge having the shape of the tearably detachable portion; and

loader means slidably received in said second axially extending bore of said second die means and having a shape conforming to and being slightly smaller than said shape of said continuous ridge;

said first die means being movable from a first position spaced axially above said first bore to a second position within said first bore for deforming said detachable portion of said sheet member and pressing said detachable portion against said continuous ridge of said ring like member;

said loader means being movable axially towards said first die means from a first position spaced axially below said deformed sheet member to a second position wherein said sheet member is further deformed upwardly to create a folded wall around the periphery of said detachable portion.

7. A process for forming a tearably detachable portion on a sheet, comprising the steps of:

a. recessing the tearably detachable portion to form a continuous thin wall at the periphery of the detachable portion; and

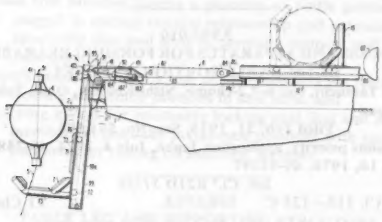
b. folding the thin wall to form a folded portion therein to weaken the periphery of the detachable portion, said folding step comprising pressing the sheet so that the detachable portion is aligned to be on the same plane with a remaining part of the sheet.

3,993,011

METHOD AND APPARATUS FOR RETRIEVING, SECURING, AND LAUNCHING AN ANCHOR BUOY

Eddie Clark Garland, Stavanger, Norway, assignor to Brown & Root, Inc., Houston, Tex.

Filed Jan. 8, 1976, Ser. No. 647,579
Int. Cl.² B63B *27/00*
U.S. Cl. 114—43.5 VC **10 Claims**



1. A method for retrieving, securing, and launching an anchor buoy, said method being operable in combination with:

floating vessel means floating on a body of water;

anchor pendant line hoisting means carried by said floating vessel means; and

anchor buoy means including

pendant line means supported thereon;

said method being characterized by:

providing anchor buoy catching means and causing said anchor buoy catching means to engage said anchor buoy means while said anchor buoy means is floating on said body of water;

providing anchor buoy elevating means and causing said anchor buoy elevating means to elevate said anchor buoy catching means, with said anchor buoy means engaged therewith; and

providing anchor buoy securing means and causing said anchor buoy securing means to move said anchor buoy catching means, with said anchor buoy means engaged therewith,

toward a substantially immobilized position above said body of water;

with said anchor buoy catching means and said anchor buoy means disposed in said substantially immobilized position, engaging said pendant line means with said pendant line hoisting means carried by said floating vessel means, and causing said pendant line hoisting means to effect hoisting of said pendant line means; and

subsequent to said hoisting, causing said pendant line means to exert a pulling force on said anchor buoy means, with said pulling force being operable to cause

said anchor buoy means to move away from said substantiially immobilized position generally toward said body of water, and

said anchor buoy means to be deposited in said body of water.

2. An apparatus for retrieving, securing, and launching an anchor buoy, said apparatus being operably in combination with;

floating vessel means floating on a body of water;

anchor pendant line hoisting means carried by said floating vessel means; and

anchor buoy means including

pendant line means supported thereon;

said apparatus being characterized by, and comprising, anchor buoy retrieving, securing, and launching means including:

anchor buoy catching means operable to engage said anchor buoy means while said anchor buoy means is floating on said body of water;

anchor buoy elevating means operable to elevate said anchor buoy catching means, with said anchor buoy means engaged therewith; and

anchor buoy securing means operable to move said anchor buoy catching means, with said anchor buoy means engaged therewith, toward a substantially immobilized position above said body of water;

said pendant line means being operable, with said anchor buoy catching means and said anchor buoy means disposed in said substantially immobilized position, to be engaged with said pendant line hoisting means carried by said floating vessel means, with said pendant line hoisting means then being operable to effect hoisting of said pendant line means; and

said pendant line hoisting means being operable to effect said hoisting of said pendant line means and operable to permit paying out of said pendant line means subsequent to said hoisting;

said paying out of said pendant line means being operable to permit said pendant line means to exert a pulling force on said anchor buoy means, with said pulling force being operable to cause

said anchor buoy means to move away from said substantially immobilized position generally toward said body of water, and

said anchor buoy means to be deposited in said body of water.

3,993,012

VESSEL FOR TRANSPORT OF BUOYANT CARGO

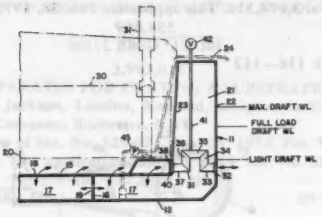
William Everett Kirby, Victoria, Hong Kong, and David Jackson Seymour, Daly City, Calif., assignors to Wharton Shipping Corporation, Edificio Vallarino, Panama

Filed June 3, 1975, Ser. No. 583,299
Int. Cl.² B63B *35/42*
U.S. Cl. 114—43.5 VC **9 Claims**

4. In a vessel for transport of floating buoyant cargo carriers and having a hull with a bottom shell, rigid cargo-supporting and hull-reinforcing structure extending above said shell, side walls extending upwardly from said shell and providing a series of buoyancy compartments, and a cargo hold, means for introducing and expelling water and air into and from said buoyancy compartments, gate means in said hull for enabling flotation loading and unloading in said hold of said floating cargo carriers and for closing during transportation thereof, and securing means for releasably locking said cargo carriers in place in said hold against movement relative to said hull all during a voyage of said vessel, the combination therewith of:

said bottom shell being imperforate,

water conduit means in said side walls communicating between the ocean and said hold for passing water from the ocean into and out of said hold in accordance with the draft of said vessel and the motion thereof during voyage,



said water conduit means comprising an inverted generally U-shaped generally vertical portion through which the water from the ocean flows into and out of said hold, and

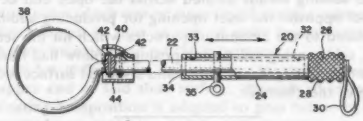
control valve means for communicating between said water conduit means and the atmosphere in a way that prevents said conduit means from siphoning water between the ocean and said hold.

3,993,013

BOAT DOCKING POLE FOR SMALL BOATS

Benny Nunziato, and Elizabeth Nunziato, both of Bayshore, N.Y., assignors to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Aug. 18, 1976, Ser. No. 605,766
Int. Cl.² B63B *21/54*
U.S. Cl. 114—221 R **3 Claims**



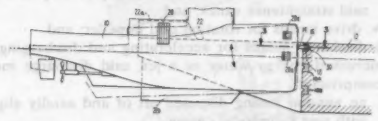
1. A boat docking and mooring aid device comprising a main elongated base section means, at least one tubular extension means engaging said base section means and extensible therefrom, said main elongated base section means comprising a hollow tubular base member having a bore formed therethrough for telescoping engagement with one of said tubular extension means closest thereto, loop means carried by the outermost one of said extension means, said loop means being capable of engaging a mooring post and other objects by a person on a boat for aiding in docking and mooring of said boat, said outermost one of said tubular extension means including an outer shank portion, said loop means comprising a rounded loop member with its outer end portion folded back and brought into engagement with said outer shank portion of said outermost one of said tubular extension means to form a hollow rounded post engaging neck portion, handle grip means carried on said main base section for being gripped by the hands of a crew member on the boat, bolt means jointly engaging said outer end portion of said loop member and the adjacent outer shank portion of said outermost tubular extension means for holding them securely together, protective cover means for fitting over said outer end portion of said loop member and said outer shank portion of said outermost tubular extension means, and said bolt means comprising a plurality of bolts of substantial length and nuts for adjusting their length to allow for adjustment of the diameter of said loop member to fit various sizes of mooring posts.

3,993,014

ARTICULATED PUSH TUG-BARGE THRUST TRANSMITTAL MEANS

Ralph W. Hooper, Newtown Square, Pa.; Douglas A. MacLeod, Wenonah, N.J., and Clarence Murray, Media, Pa., assignors to Interstate Oil Transport Company, Philadelphia, Pa.

Filed Aug. 7, 1975, Ser. No. 602,557
Int. Cl.² B63B *21/56*
U.S. Cl. 114—235 R **5 Claims**



1. Push tug and barge with thrust transmittal means comprising:

a. cylindrical member projecting forwardly from the bow of the tug, said cylindrical member including at its forward end a convex hemispheric frontal surface;

b. a thrust receiving member mounted centrally on the stern of said barge, said receiving member including a hemispheric concave surface adapted to receive and mate with said convex frontal surface of said cylindrical member;

c. the mating surfaces formed between the cylindrical and receiving members providing the sole means of transmitting pushing thrust to said barge from said tug while permitting relative pitching therebetween;

d. a notch at the stern of said barge with sidewalls on the two sides thereof, said barge stern and sidewalls and the bow of said tug being adapted so that said bow fits between said sidewalls upon engagement of said tug and barge, including fenders, rollers or other means through which contact is made between said sidewalls and the sides of said tug to limit relative motion therebetween; and

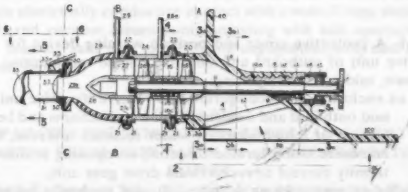
e. quickly releasable means independent of said cylindric and thrust receiving members, to restrain said tug and barge from separating from one another.

3,993,015

HYDRAULIC JET PROPULSION SYSTEM

Janusz Klepacz, and Joseph Menet, both of West Nyack, N.Y., assignors to Janusz Klepacz, West Nyack, N.Y.

Continuation of Ser. No. 407,852, Oct. 19, 1973, abandoned. This application Nov. 14, 1975, Ser. No. 631,992
Int. Cl.² B63H *11/02*
U.S. Cl. 115—14 **30 Claims**



13. In an hydraulic jet propulsion system for watercraft the combination comprising:

an intake means for directing incoming water from under the craft, said intake means comprising:

i. means for defining an intake passage;

ii. means for defining in the underside of the craft a parallel-sided intake opening to said intake passage with an aftward open end; and

iii. means disposed above said aftward open end for defining a cylindrical outlet opening from said intake passage;

b. a pump means for receiving incoming water from said intake section and increasing the energy thereof, said pump means comprising:

i. a cylindrical casing disposed aft of and in axial alignment with said cylindrical outlet opening;

ii. at least one set of straightener vanes fixed in said casing;

iii. at least one rotatable impeller disposed upstream of said straightener vanes; and

iv. drive means for rotating said impeller; and

c. a discharge means for accelerating and discharging the increased energy water as a jet, said discharge means comprising:

i. an annular casing disposed aft of and axially aligned with said cylindrical casing;

ii. means for defining an acceleration chamber with an aftwardly diminishing interior diameter within aid annular casing;

iii. an outlet end integral with said annular casing; and

iv. means within said outlet end for defining a cylindrical opening at the exit of said acceleration chamber.

3,993,016

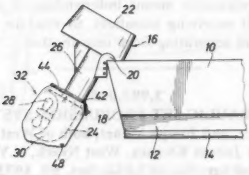
PROTECTIVE ENCLOSURE AND POSITION WARNING DEVICE FOR OUTDRIVE ENGINES

Eugene A. Pulaski, P.O. Box 42229, Houston, Tex. 77042

Filed Aug. 4, 1975, Ser. No. 603,022

Int. Cl.² B60Q *1/30*

U.S. Cl. 116—2 **14 Claims**



1. A protective cover and position warning device for the drive unit of outboard and outdrive engine mechanisms for boats, said cover comprising:

an enclosure of a configuration to receive the drive unit of said outboard and outdrive engine mechanisms and being formed of a high visibility water resistant material, said enclosure being formed to define an opening at one extremity thereof to receive said drive gear unit;

closure means being attached to said enclosure adjacent said opening and being manipulatable to draw the material at said opening of said enclosure about said drive unit, said closure means retaining said enclosure in assembly with said drive unit; and

drain means is formed in said material of said enclosure and, when in assembly with said drive unit, is positioned at the lower portion of said enclosure, water entering said enclosure through said opening of said enclosure and from said engine will exit said enclosure at said drain means.

3,993,017

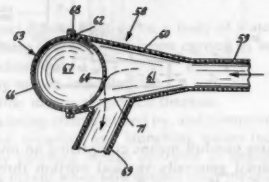
PARTICLE FLOW MONITOR

Robert J. De brey, 4502 Browndale Ave., Minneapolis, Minn. 55424

Division of Ser. No. 514,644, Oct. 15, 1974, which is a division of Ser. No. 268,538, July 3, 1972, Pat. No. 3,842,791, which is a continuation-in-part of Ser. No. 37,157, May 14, 1970, Pat. No. 3,674,316. This application Feb. 28, 1975, Ser. No. 554,069

Int. Cl.² G08B *21/00*

U.S. Cl. 116—112 **26 Claims**



1. An apparatus for sensing particles in a flowing fluid comprising: first means having a first passage for carrying fluid; second means having a second passage for carrying fluid; connecting means joining the first means with the second means, said connecting means comprising a housing having an inside wall surrounding a chamber open to the first passage and the second passage whereby fluid and particles flow through said chamber, said housing having an inlet opening in communication with the first passage, an outlet opening in communication with the second passage, and an open end opposite the inlet opening, said inside wall increasing in size from the inlet opening to the open end whereby the size of the chamber increases from the inlet opening to the open end, particle sensing means located across the open end of said chamber opposite the inlet opening for producing audio signals related to the amount of particles which hit the sensing means, said sensing means comprising a hollow ball having a first surface facing the chamber and a second surface located outside of the chamber.

3,993,018

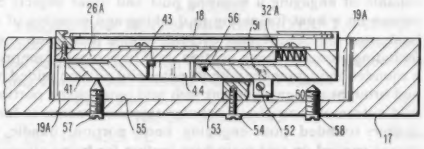
CENTRIFUGAL SUPPORT FOR WORKPIECES

John R. Kranik, Poughkeepsie, and Wolfgang F. Mueller, Wappingers Falls, both of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Nov. 12, 1975, Ser. No. 631,013

Int. Cl.² B05C *11/02*

U.S. Cl. 118—52 **14 Claims**



1. A rotatable support for a workpiece comprising:

A. a holder for said workpiece in spaced relation to a first axis of rotation with said holder normally disposed under gravitational force in a first position within a plane substantially perpendicular to said first axis;

B. means for rotating said support whereby to orbit said holder about said first axis;

C. means for tilting said holder to a preselected angle about a second axis spaced from and perpendicular to said first axis in response to centrifugal force of said rotation, with

said tilting disposing said holder in a plane transverse said axis;

D. said holder comprising jaw means normally disposed in open workpiece receiving position in radially spaced relation to said first axis of rotation; and means for clamping said jaws means about said workpiece during said rotation in response to centrifugal force thereof.

3,993,019

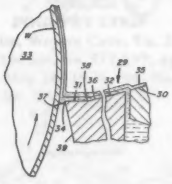
APPARATUS FOR COATING A SUBSTRATE

Brian W. Jackson, London, England, assignor to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 326,621, Jan. 26, 1973, Pat. No. 3,928,678. This application June 19, 1975, Ser. No. 588,260

Int. Cl.² B05C *5/02*

U.S. Cl. 118—50 **20 Claims**



1. An apparatus for coating one or more liquid coating compositions onto a surface of a substrate, said apparatus comprising:

means for defining a downwardly inclined planar slide surface upon which one or more liquid coating compositions are adapted to flow as one or more layers respectively before being coated on the substrate;

means for defining an exit opening located adjacent the upper end of said slide surface, through which a liquid coating composition is adapted to pass before being deposited onto said planar slide surface; and

means for defining a rigid lip portion which extends from and is continuous with the lower end of said planar slide surface and is adapted to have the one or more liquid coating compositions flow thereon, said lip portion being directed in the direction of liquid flow at an angle of lesser inclination to the horizontal than that of said planar slide surface.

3,993,020

BLADE APPLICATOR ASSEMBLY

John M. Schneider, Fairport; Herman A. Hermanson, Penfield, and Christian O. Abreu, Rochester, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed May 16, 1975, Ser. No. 578,388

Int. Cl.² B05C *3/02*

U.S. Cl. 118—407 **4 Claims**

1. A coating apparatus comprising in combination:

a. a coater blade base;

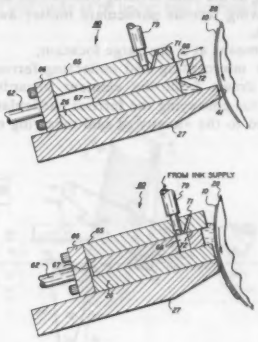
b. an applicator plate supported on a top surface of said coater blade base;

c. a metering plate including a metering cavity supported on a top surface of said applicator plate;

d. a valve plate supported on a top surface of said metering plate, said valve plate including means for supplying ink;

e. a backup roll mounted adjacent and in close proximity to said coater blade base; and

f. means for reciprocating said applicator plate and said valve plate forward and rearward intermittently for moving ink to a top surface of said coater blade base and for moving the ink from a top surface of the coater blade



base into a metering gap formed between the coater blade base and the backup roll.

3,993,021

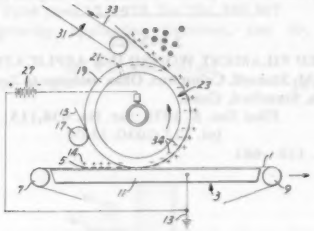
TRANSFER DEVICE

Robert J. Kline, Stillwater, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Division of Ser. No. 368,108, June 8, 1973, Pat. No. 3,900,591. This application Apr. 4, 1975, Ser. No. 564,999

Int. Cl.² G03G *15/16*

U.S. Cl. 118—651 **4 Claims**



1. An apparatus comprising an electrically conductive support member having apertures therein overlying which is a surface layer in the form of a pile fabric having a multiplicity of electrically conductive fibrous loops adapted to make intimate electrically conductive contact with a web of copy material, and vacuum means communicating with said apertures for drawing said web into clinging engagement with said fibrous loops.

3,993,022

APPARATUS FOR REMOVING FERROUS PARTICULATE MATTER FROM COPY PAPER IN AN ELECTROSTATIC COPIER

Robert E. Zimmer, Niles, Ill., assignor to Addressograph Multigraph Corporation, Cleveland, Ohio

Filed Aug. 1, 1975, Ser. No. 601,389

Int. Cl.² G03G *13/08*

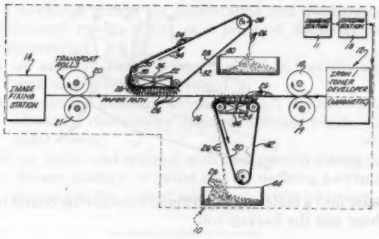
U.S. Cl. 118—652 **1 Claim**

1. In an electrostatic copier having means for transporting, along a predetermined path, an element whose surface bears an image of electrostatic toner particles and residual ferrous carrier particles, resulting from treatment by an electrostatic developer of the magnetic brush type, the improvement comprising:

magnet means arranged adjacent said predetermined path for creating a magnetic field around a portion of said element, as the same is being transported along said path, for drawing ferrous particulate matter away from said element;

receiving means at a discharge location;

means for intercepting and collecting ferrous particulate matter drawn from the element towards the magnet means, for conveying the ferrous particulate matter thus collected to the vicinity of said receiving means and for



releasing the ferrous particulate material at said receiving means, said means for intercepting, conveying and releasing comprising:

a continuous flexible belt passing between the element and the magnet and having textured surface oriented away from the magnet and towards the element when lying between the same;

guide and support means for the belt; and means for driving the belt in its path about said guide and support means.

3,993,023

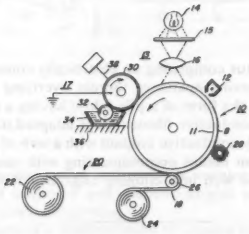
COATED FILAMENT WOUND INK APPLICATOR ROLL

Stanley M. Stansell, Columbus, Ohio, assignor to Xerox Corporation, Stamford, Conn.

Filed Dec. 5, 1975, Ser. No. 638,113

Int. Cl.² G03G *13/00*

U.S. Cl. 118—661 **8 Claims**



1. An electrostatic reproduction system comprising a means for establishing latent electrostatic images on a photoreceptive surface, a means for developing said latent electrostatic image by applying a polar ink to imaged areas of the surface, said developing means having an ink applicator body which is positioned adjacent said photoreceptive surface for transferring ink from said applicator body to said photoreceptive surface, said applicator body having an array of lands and depressions formed on a surface thereof, including superficial grooves being arranged substantially perpendicular to the revolution axis of the developer roller, said grooves being formed by the winding of synthetic resin filament about said cylindrical roll; said synthetic resin filament having been coated with an adhesive solution containing a formic acid prior to winding.

3,993,024

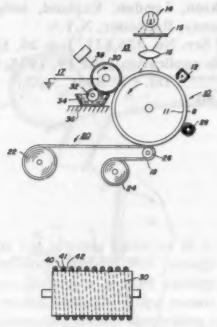
FILAMENT WOUND INK APPLICATOR ROLL

Stanley M. Stansell, Columbus, Ohio, assignor to Xerox Corporation, Stamford, Conn.

Filed Dec. 5, 1975, Ser. No. 638,112

Int. Cl.² G03G *13/00*

U.S. Cl. 118—661 **8 Claims**



1. An electrostatographic reproduction system comprising a means for establishing latent electrostatic images on a photoreceptive surface, a means for developing said latent electrostatic image by applying a polar ink to imaged areas of the surface, said developing means having an ink applicator body which is positioned adjacent said photoreceptive surface for transferring ink from said applicator body to said photoreceptive surface, said applicator body having an array of lands and depressions formed on a surface thereof, including superficial grooves being arranged substantially perpendicular to the revolution axis of the developer roller, said grooves being formed by the winding of synthetic resin filament about said cylindrical roll; said synthetic resin filament having been coated with an adhesive solution containing a phenol compound prior to winding.

3,993,025

MACHINE FOR THE CONTINUOUS REVERSE-COATING OF SHEET-FORM MATERIAL WITH POLYURETHANE FOAM

Horst Bokelmann, Bad Wildungen, Germany, assignor to Metzeler Schaum Gesellschaft mit beschrankter Haftung, Memmingen, Germany

Filed May 19, 1975, Ser. No. 578,921

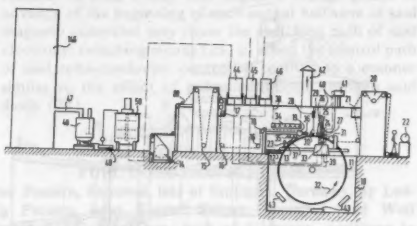
Claims priority, application Germany, May 24, 1974, 2425008

Int. Cl.² B05C *1/08*

U.S. Cl. 118—642 **9 Claims**

1. In an installation for coating sheet material, a combination comprising, a driven large diameter light weight drum having a peripheral wall formed of glass fiber reinforced plastic material, endless metal reinforcements embedded in said plastic material, and a thin layer of plastic material surrounding said glass fiber reinforced plastic material; means for applying coating material in a layer of predetermined thickness to an upper peripheral surface of said drum; means for continuously applying the sheet material in tensioned condition to the coated peripheral surface of the drum so that the sheet material engages with one face thereof the layer of coating material whereby the latter penetrates into the sheet material; first heating means upstream of said drum for heating said face of the sheet material immediately before it contacts the coating material on the drum; second heating

means surrounding at least part of the peripheral surface of the drum to which the sheet material is applied so that the



coating material penetrating the sheet material hardens; and means for continuously withdrawing the coated sheet material from the drum.

3,993,026

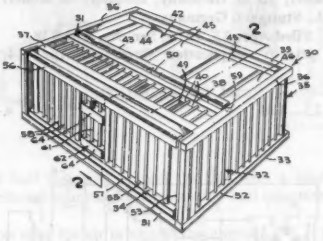
POULTRY COOP

George W. Shreckhise, Weyers Cave, Va. 24486

Continuation-in-part of Ser. No. 571,697, April 25, 1975. This application May 28, 1975, Ser. No. 581,669

Int. Cl.² A01K *31/07*

U.S. Cl. 119—19 **3 Claims**



1. A poultry coop, comprising a top including spaced parallel end pieces, first, second and third cross pieces extending between said end pieces and secured thereto, spaced parallel dowels extending between said first and second cross pieces and secured thereto, there being a full length approximately one-half width top door opening in said top defined and provided between said second and third cross pieces, there being elongated slots in the inner surfaces of said end pieces, a full length one-half width door mounted for movement into and out of open and closed relation with respect to said door opening, and said door including first and second bars, flat members extending between said bars and secured thereto, said first bar having reduced diameter end portions, pivot pegs on the reduced diameter end portions swivelly and slidably engaging said slots, coil springs having one end anchored to said end piece and said coil springs connected to said pegs, stop members secured to said end pieces for limiting closing movement of said door, and a latch member for said door operatively connected to said coop.

3,993,027

CAT SCRATCHING POST

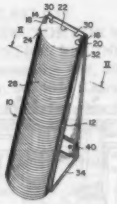
A. Donald Mullin, New York, N.Y., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Mar. 6, 1975, Ser. No. 551,492

Int. Cl.² A01K *29/00*

U.S. Cl. 119—29 **8 Claims**

1. A cat scratching post device comprising a main backing plate, a plurality of stacked, planar climbing sheets disposed on said main backing plate and extending outwardly therefrom and support means, said support means comprising a wall plate secured to said main backing plate, bottom flange bracket means carried by said wall plate for extending outwardly from a room wall, and upper wall engaging means carried by said wall plate at its upper end portion for engaging



the upper portion of said wall plate directly to said room wall, and bottom flange bracket means constraining said wall plate into an angular deviation relative to the verticality of said room wall, whereby said main climbing and scratching means is supported in an inclined disposition out of the vertical for facilitating scratching and climbing thereof.

3,993,028

DEVICE FOR FEEDING FISH

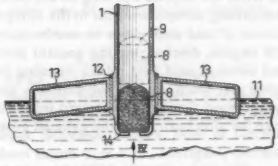
Hans Baensch, Melle, and Hans Burger, Iserlohn, both of Germany, assignors to Ulrich Baensch, Melle, Germany

Filed June 12, 1975, Ser. No. 586,307

Claims priority, application Germany, Jan. 29, 1974, 2404084

Int. Cl.² A01K *61/02*

U.S. Cl. 119—51 R **14 Claims**

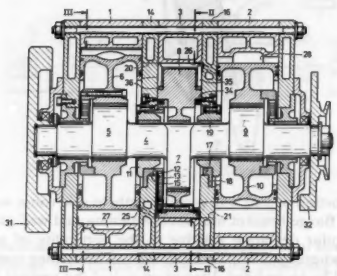


1. A device for feeding fish, especially pet fish, which includes: a floating body adapted to float on water, tubular means forming an angle with said floating body and being supported thereby for slidingly receiving and guiding bodies of fish food, said tubular means extending below the water line of said floating body and being partially open at the lower end thereof so as to hold bodies of fish food in said tubular means while permitting fish to have access to the respective lowermost body of fish food in said tubular means, in which said floating body comprises a plurality of floating members distributed around the circumference of each tubular means, said floating members being exchangeably connected to said tubular means.

3,993,029
METHOD OF OPERATING A COMPOUND SUPERCHARGED ROTARY PISTON ENGINE

Dankwart Eiermann, and Felix Wankel, both of Lindau, Germany, assignors to Wankel GmbH, Lindau, Germany

Division of Ser. No. 374,046, June 27, 1973, Pat. No. 3,918,413. This application Aug. 28, 1975, Ser. No. 608,651
Claims priority, application Germany, July 5, 1972, 2233014
Int. Cl.² F02B *53/08*
U.S. Cl. 123—8.07 **3 Claims**



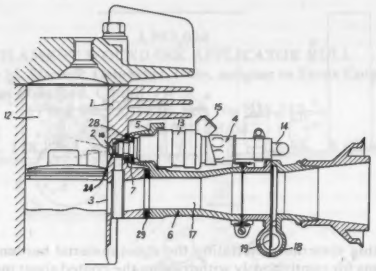
1. The method of operating a compound supercharged rotary piston engine having a pair of engines with rotary pistons in axially spaced chambers and mounted on the same shaft, and an air compressor driven by said shaft and compressing air on each half revolution of said shaft prior to combustion in each engine, the chamber of each engine having a first intake opening to supply air for combustion and a second intake opening on the diametrically opposite side from the first intake opening to supply air for burning of exhaust gases following combustion, the respective openings of each engine being angularly spaced by 180° from those of the other engine and the first intake opening of each engine being axially spaced from the second opening of the other engine, said method comprising compressing air in the compressor on each half revolution of said shaft prior to combustion in the chamber of each engine, discharging the greater portion of the air compressed through said first intake opening for combustion in one engine and discharging a substantially lesser portion of said air compressed through the second intake opening of the other engine for afterburning of the exhaust gases in said other engine.

3,993,030
INJECTOR SUPPORT FOR DIRECT INJECTION ENGINES

Eric Jaulmes, Paris, France, assignor to Ateliers de la Motobecane, Pantin, France

Filed July 17, 1975, Ser. No. 596,673
Claims priority, application France, Aug. 6, 1974, 74.27242
Int. Cl.² F02B *33/07*
U.S. Cl. 123—32 R **7 Claims**

1. A fuel injection assembly for a direct injection engine having orifices in the cylinder wall for receiving fuel and air, comprising:
- a fuel injector aligned with one of the orifices in the cylinder wall;
- an air intake manifold aligned with the other of the orifices in the cylinder wall; and
- a metal sheet between said injector and the cylinder wall and having an orifice aligned with the orifice in the cylinder wall, said metal sheet consisting of an extension of

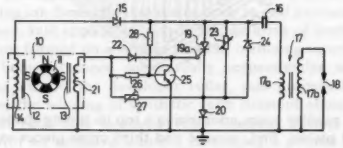


said air intake manifold and serving as a heat shield between said injector and the wall of the cylinder.

3,993,031
ELECTRONIC MAGNETO IGNITION SYSTEM WITH ENGINE SPEED LIMITING

Peter Schmaldienst, Nurnberg; Werner Meier, Schwabach; Georg Haubner, Berg, and Jurgen Wesemeyer, Nurnberg-Reichelsdorf, all of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Apr. 23, 1975, Ser. No. 570,838
Claims priority, application Germany, Apr. 24, 1974, 2419776
Int. Cl.² F02P *1/00*
U.S. Cl. 123—118 **4 Claims**



1. Electronically controlled magneto ignition system for an internal combustion engine comprising:
- an engine driven magneto generator (**10**) having a control winding (**21**) and an energy supply winding (**14**);
- energy storage means (**16**) for storing the electrical energy of an output halfwave of the energy supply winding of said magneto generator;
- energy transformation means including primary and secondary windings, said secondary winding being a high voltage winding;
- a semi-conductor controlled rectifier (**19**) for discharging electrical energy from said storage means through said primary winding, having a switching path and a control path, said control path including a control electrode (**19***a*) connected to said control winding (**21**) through a diode (**22**) poled so as to connect positive ignition timing pulses from said control winding to said control electrode of said semi-conductor controlled rectifier, and
- electronic switching means (**25**) for applying an auxiliary control voltage (U_s) to said control electrode (**19***a*) of said semi-conductor controlled rectifier (**19**) in such a manner as to put said semi-conductor controlled rectifier in conducting condition from a time in advance of the generation of said output halfwave of said magneto generator until the end of said output halfwave when a maximum permissible speed is exceeded and thereby to limit

engine speed, said electronic switching means (25) being connected to said control winding (21) and to said control electrode (19a) of said semi-conductor controlled rectifier in such a way that negative voltage pulses in advance of the beginning of each output halfwave of said magneto generator may cause the switching path of said electronic switching means (25) to affect the control path of said semi-conductor controlled rectifier in a manner similar to the effect of pulses connected through said diode (22).

3,993,032

FUEL INJECTION SYSTEMS

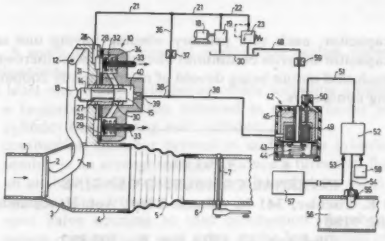
Walter Passera, deceased, late of Stuttgart, Germany, by Ludwig Passera, heir; Konrad Eckert, Stuttgart, and Wolf Wessel, Schwieberdingen, both of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed May 13, 1975, Ser. No. 577,119

Claims priority, application Germany, May 13, 1974, 2324110

Int. Cl.² F02M 69/00

U.S. Cl. 123—139 AW **11 Claims**



1. In a fuel injection system for use with a spark plug-ignited, internal combustion engine, the fuel injection system having:

a suction tube for air intake to the engine,

an air sensor disposed in said suction tube,

an arbitrarily operable butterfly valve disposed is said suction tube in series with said air sensor,

a fuel supply conduit,

a control pressure conduit,

an uncoupling throttle disposed between said fuel supply conduit and said control pressure conduit,

a fuel metering valve connected to said fuel supply conduit and said control pressure conduit for continuously injecting fuel into said suction tube,

a control plunger, serving as the movable member of said fuel metering valve, said control plunger being acted upon on one end by said air sensor, and on an opposite end by a return force provided by liquid under pressure delivered by said control pressure conduit, for metering a fuel quantity that is proportionate to the quantity of air measured by said air sensor, and

at least one electromagnetic valve disposed in said control pressure conduit for varying pressure in said control pressure conduit in dependence on at least one operating parameter of the engine, the improvement in the fuel injection system which comprises, in combination:

a. a temperature gauging transmitter which senses and converts an engine temperature into a proportionate electrical voltage output;

b. means for sensing and converting an engine operating parameter other than temperature into a proportionate electrical voltage output; and

c. an electronic control device, electrically connected to an operating coil of the electromagnetic valve and the outputs of the temperature gauging transmitter and the means for sensing and converting an engine operating parameter other than temperature, which comprises a switching means which allows the electronic control device to actuate the electromagnetic valve proportionate to the voltage output of the temperature gauging transmitter during the engine warmup, and then switch to activate the electromagnetic valve proportionate to the voltage output of the means for sensing and converting an engine operating parameter other than temperature.

3,993,033

FUEL QUANTITY DISTRIBUTOR FOR MULTICYLINDER COMBUSTION ENGINE

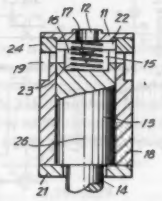
Asoke Chattopadhyay, Ulmenallee 134, 4041 Norf, and Wolfgang Müller, Kleinsiepstr. 56, 4044 Kaarst, both of Germany

Filed Mar. 27, 1975, Ser. No. 562,451

Claims priority, application Germany, June 20, 1974, 2429716

Int. Cl.² F02M 69/00

U.S. Cl. 123—139 BC **9 Claims**



1. A fuel quantity distributor for multicylinder combustion engines comprising, in combination, two concentric, radially adjacent metering elements having metering inlet channels and being rotatable relative to one another, the edges of the metering inlet channels intersecting each other and opening a variable non-rectangular cross-section, the ratio of wetted perimeter to the diameter of the inscribed circle from the idling position to at least the partial load position being substantially constant when one-third of the maximum cross-section is open, said ratio being substantially less than 6.0, said ratio being measured in the plane of said cross-section, and a spacer ring on the upper boundary of said metering inlet channels of the outer one of said metering elements.

3,993,034

FUEL INJECTION SYSTEM

Walter Passera, deceased, late of Stuttgart, Germany, by Ludwig Passera, heir; Heinrich Knapp, Leonberg-Silberberg, and Wolf Wessel, Schwieberdingen, both of Germany, assignors to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed May 13, 1975, Ser. No. 577,118

Claims priority, application Germany, May 13, 1974, 2423109

Int. Cl.² F02M 69/00

U.S. Cl. 123—139 AW **1 Claim**

1. A fuel injection system for externally ignited internal combustion engines comprising in combination:

a. a suction tube for air intake to the engine;

b. an air sensor disposed in said suction tube;

c. an arbitrarily operable butterfly valve disposed in said suction tube in series with said air sensor;

d. a fuel supply conduit;

e. a control pressure conduit;

f. an uncoupling throttle disposed between said fuel supply conduit and said control pressure conduit;

g. a fuel metering valve connected to said fuel supply conduit and said control pressure conduit for continuously injecting fuel into said suction tube;

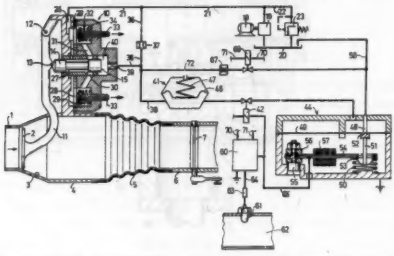
h. a control plunger, serving as the movable member of said fuel metering valve, said control plunger being acted upon on one end by said air sensor, and on an opposite end by a return force provided by liquid under pressure delivered by said control pressure conduit, for metering a fuel quantity that is proportionate to the quantity of air measured by said air sensor;

i. at least one electromagnetic valve disposed in said control pressure conduit for varying pressure in said control pressure conduit in dependence on at least one operating parameter of the engine;

j. at least one pressure regulating valve having a temperature-dependent heatable control element mounted therein, said regulating valve also serving to vary the pressure in said control pressure conduit;

k. a storage element for hydraulic integration during pressure changes in the control pressure conduit;

l. an oxygen probe for detecting the oxygen content of the exhaust gas of the internal combustion engine;



m. an electronic amplifier connected to the oxygen probe;

n. a first throttle; and

o. a second electromagnetic valve disposed parallel to the storage element, the electromagnetic valve and the pressure regulating valve, wherein:

i. the storage element, the electromagnetic valve and the pressure regulating valve are disposed in series in the control pressure conduit downstream of the uncoupling throttle;

ii. the restoring force exerted against the control plunger is generated by the fuel pressure downstream of the uncoupling throttle;

iii. the second electromagnetic valve is controlled by the oxygen probe via the electronic amplifier as a function of the oxygen content of the exhaust gas of the internal combination engine; and

iv. during the warm-up phase of the internal combustion engine the electromagnetic valve is open and the second electromagnetic valve is closed.

3,993,035

DOUBLE ENERGY INDUCTIVE-CAPACITIVE DISCHARGE IGNITION SYSTEM

Martin E. Gerry, 13452 Winthrope St., Santa Ana, Calif. 92705

Continuation-in-part of Ser. No. 378,273, July 11, 1973, Pat. No. 3,886,923. This application Apr. 9, 1975, Ser. No. 566,422

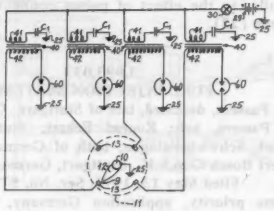
Int. Cl.² F02P *1/00*

U.S. Cl. 123—148 E **12 Claims**

1. An ignition system impelled by a motive drive during its operative mode, comprising in combination:

a single rotary distributor switch having a plural number of stationary members and an arm one end of which is attached to the motive drive and the other end thereof is translated past said members during said operative mode without cooperating with said members;

a plural number of transformers, each of the transformers having a primary winding and a secondary winding, one end of one of the secondary windings being electrically connected to a corresponding one of the members; and



a capacitor, each said primary winding having one said capacitor in series continuous electrical circuit therewith, each said circuit being devoid of intermittently cooperating contactors.

3,993,036

INTERNAL COMBUSTION ENGINE

Wald E. Tischler, 341 N. Atlantic Blvd., Apt. H, Alhambra, Calif. 91801

Filed Aug. 27, 1974, Ser. No. 500,892

Int. Cl.² F01L *7/00*

U.S. Cl. 123—190 A **3 Claims**

1. An internal combustion engine comprising

a cylinder block having a cylinder,

a piston movable through a stroke in said cylinder,

a cylinder head on said block,

a rotary valve comprising

a stator sleeve on said cylinder head and

a rotor sleeve rotatable in said stator sleeve;

said stator sleeve having a port communicating with said cylinder,

said rotor sleeve having a port for uncovering said stator port,

a shutter rotatably supported by said rotor and

means tending to move said shutter to at least partially cover said rotor port,

said shutter being effective upon increase in engine speed to react against said last mentioned means whereby to uncover a greater amount of said rotor port.

3,993,037

SPARK IGNITION ENGINE HAVING COMBUSTION CHAMBER PROVIDED WITH VENT VALVE

Kosaburo Mukai, Tokyo; Motohiro Shinzawa, and Seishi Yasuhara, both of Yokosuka, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

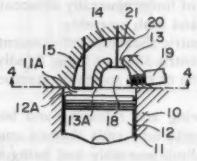
Filed May 3, 1974, Ser. No. 466,906

Claims priority, application Japan, May 4, 1973, 48-50059

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 16, 1976

Int. Cl.² F02B *23/08*

U.S. Cl. 123—191 S **6 Claims**



1. A spark ignition internal combustion engine, having in combination:

at least one engine cylinder assembly including a cylinder, a reciprocating piston received in said cylinder and a cylinder head sealing said cylinder;

a combustion chamber defined in said engine cylinder assembly in an arrangement to produce a turburent flow of an air-fuel mixture therein at a relatively later stage of a compression stroke;

a vent valve opening to said combustion chamber and means opening said vent valve at the last portion of the compression stroke and closing said vent valve before ignition, whereby a fractional amount of the air-fuel mixture is discharged from said combustion chamber to weaken the turburent flow; said combustion chamber being formed of a cylindrical chamber defined in said cylinder between a top surface of said piston and a base surface of said cylinder head, and a dome-shaped recess formed in said cylinder head, the bottom thereof being opened and conjoined with said cylindrical chamber, a major portion of said combustion chamber being defined by said dome-shaped recess; a spark plug being arranged to expose a spark gap thereof to said dome-shaped recess, and said vent valve is opening to said dome-shaped recess; said dome-shaped recess being formed in said cylinder head off center from a longitudinal center line of said cylinder, the open end of said dome-shaped recess having an opening area smaller than 50% of the cross-sectional area of the cylinder to which the opening is conjoined; and said vent valve is located at a curved end region of said dome-shaped recess which is opposite the open end thereof.

3,993,038

SYSTEM FOR PREVENTING DRIVE TRAIN START OF A MOTOR VEHICLE INTERNAL COMBUSTION ENGINE

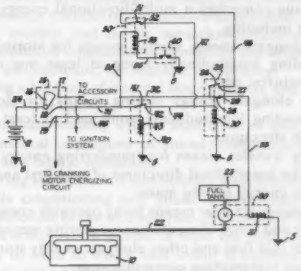
Robert D. Alt, Warren, and Charles H. Huebner, Royal Oak, both of Mich., assignors to General Motors Corporation, Detroit, Mich.

Filed Aug. 29, 1975, Ser. No. 609,018

Int. Cl.² F02B *77/08*

U.S. Cl. 123—198 DB **5 Claims**

1. A system for preventing drive train start of a motor vehicle internal combustion engine, comprising: a solenoid operated valve effective to interrupt the flow of fuel to the engine while the operating solenoid thereof is energized; an electrical switching device having a normally closed contact pair and being of the type responsive to the application of electrical power thereto to operate said contact pair to the electrical circuit open condition; an electrically energizable energizing circuit for said operating solenoid of said solenoid operated valve including at least said normally closed contact pair of said electrical switching device; electric circuit means effective to apply electrical power to said electrical switching device while said engine is in the normal cranking mode; and holding circuit means effective to supply electrical power to said electrical switching device while said engine is operating in the running mode, said holding circuit means including circuit means effective to interrupt said holding circuit means while said engine is in the not-running mode.



3,993,039

COMPOUND ARCHER BOW

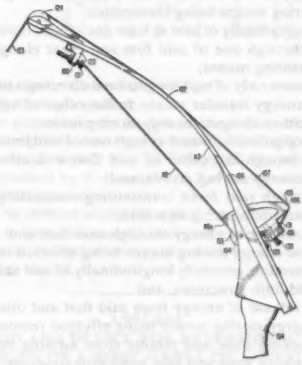
Harold W. Groves; Mark J. Davis, and D. Richard Anderson, all of Albuquerque, N. Mex., assignors to Sandia Sports, Inc., Albuquerque, N. Mex.

Continuation of Ser. No. 415,544, Nov. 11, 1973, abandoned.

This application Mar. 10, 1975, Ser. No. 557,129

Int. Cl.² F41B *5/00*

U.S. Cl. 124—23 R **9 Claims**



1. In an archery apparatus comprising:

a limb and hand grip assembly including

a first limb structure,

a second limb structure, and

a hand grip structure,

said hand grip structure interconnecting said first and second limb structures,

with said first and second limb structures extending generally oppositely away from said hand grip structure, and

energy storing and releasing means operble to store and release energy and including

a bow string structure extending between said first and second limb structures, and

said bow string structure providing a mocking zone operable to engage an arrow;

the improvement wherein said energy storing and releasing means comprises a multi-directional energy storing system including

first elongate energy storing means for storing energy extending longitudinally along at least one of said limb structures; and

other elongate energy storing means for storing energy extending longitudinally aong said at least one of said limb structures;

energy transfer means for transferring energy transversely of the longitudinal directions of said first and other elongate energy storing mens;

said energy transfer means being operably connected to said first and other elongate energy storing meant to interconnect said first and other elongate energy storing means in force transmitting communicaton;

anchor means connecting a first end of said interconnected first and other elongate energy storing means with said limb and hand grip assembly;

force transmitting connecting means connecting a second end of said interconnected first and other elongate energy storing means with one end of said bow string structure;

stressing means operable in response to the imposition of pulling force on said bow string structure to stress said first and other elongate energy storing means, in said directions extending longitudinally of said at least one of said limb structures and thereby store energy in multiple zones extending generally longitudinally of said at least one of said limb structures, said multiple zones comprising a plurality of zones, at least one of which includes said first elongate energy storing means and at least another of which includes said other elongate energy storing means;

said stressing means being operable in response to the release of said bow string structure to release said energy stored in said multiple zones by said first and other elongate energy storing means with

energy stored in said first and other elongate energy storing means being transmitted

longitudinally of said at least one of said limb structures through one of said first and other elongate energy storing means,

transversely of said longitudinal directions through said energy transfer means to the other of said first and other elongate energy storing means,

longitudinally of said at least one of said limb structures through the other of said first and other elongate energy storing means, and

through said force transmitting connecting means to said bow string structure,

said release of energy through said first and other elongate energy storing means being effected in directions extending generally longitudinally of said at least one of said limb structures, and

said release of energy from said first and other elongate energy storing means being effected remote from said nocking zone and remote from an area between said nocking zone and said hand grip structure;

said first and other energy storing means cooperating with said bow string structure to provide a substantially unobstructed area between said bow string structure and said hand grip structure.

8. An archery bow comprising:

a handle and limb assembly including

an elongate handle member having spaced apart ends, and

a pair of elongate resilient limbs connected to the ends of said handle member and projecting outwardly therefrom, said limbs having free terminal ends,

support means mounted on said limbs adjacent the free terminal ends thereof;

said support means including a first pair of similar rotatable members, each rotatable member of said first pair of rotatable members being mounted on one of said limbs adjacent the end thereof;

a second pair of similar rotatable members each rotatable member of said second pair of rotatable members being revolvably and eccentrically mounted on said handle and limb assembly immediately adjacent an end of said handle member;

said rotatable members of said second par being located generally adjacent opposite ends of said handle member and said rotatable members of said first pair being located on said pair of limbs generally adjacent opposite ends of said handle and limb assembly;

a pair of concentric sheaves, each concentric sheave of said pair of concentric sheaves being fixedly connected to an associated one of said rotatable members and revolvable therewith;

an energy storing and releasing and bowstring assembly having opposite free ends thereof connected with said handle and limb assembly and being supported by said first and second pairs of rotatable members and defining a nocking stretch between said first pair of rotatable members, said nocking stretch being movable between drawn and rest positions, with said rotatable members of said first and second pair being revolvable in response to movement of the nocking stretch between the drawn and rest positions; and

an elongate flexible, endless connecting cable trained about said spaced apart concentric sheaves to define a pair of stretches which cross each other and cooperate with said concentric sheaves to cause said second pair of rotatable members to rotate in unison in response to movement of the nocking stretch between drawn and rest position.

3,993,040

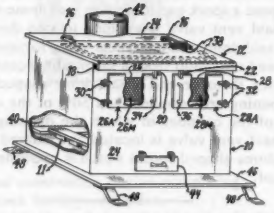
WOOD BURNING STOVE

Lawrence J. Antone, Star Route, Dalton, Mass. 01226

Filed Feb. 6, 1975, Ser. No. 547,566

Int. Cl.² F24C *1/00*

U.S. Cl. 126—60 **1 Claim**



1. A wood burning stove having a fire box adapted to receive a fuel which is burned therein, the improvement comprising:

a fuel insertion door which forms a portion of the top of said fire box, a part of said fuel insertion door overhanging the front of said fire box when said fuel insertion door is closed;

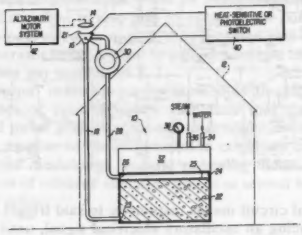
a viewing door connected to said fire box which closes to cover an opening in said fire box, a closure of said viewing door being maintained by said overhanging part; and

a metal bar connected to the inside of said fuel insertion door adjacent to an edge thereof whereby said bar deflects cinders propelled from said burning fuel toward said edge when said insertion door is closed.

3,993,041
SOLAR ENERGIZED STEAM GENERATOR SYSTEM

William F. Diggs, 3302 Clifton Ave., Baltimore, Md. 21216

Filed Oct. 23, 1975, Ser. No. 625,092
Int. Cl.² F24J 3/02
U.S. Cl. 126—271 14 Claims

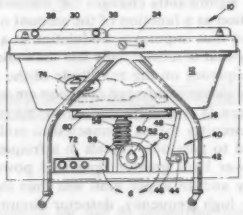


1. A solar energized steam generator system, comprising:
solar energy collecting and concentrating means for collecting and concentrating solar energy;
optical reflector means operatively connected to said collecting and concentrating means for receiving said collected and concentrated solar energy and for concentrating said solar energy still further.
insulated vault means operatively connected to said reflector means for directly receiving heated air from said reflector means so as to be directly heated thereby;
air conduit means interposed between said vault and said reflector means for conducting air from said vault back to said reflector means;
blower means disposed within said air conduit means for recirculating said air through said reflector, said vault, and said air conduit means, said air being heated within said reflector means and said vault; and
steam generator means operatively connected to said air conduit means in a heat exchange relationship for receiving said heat from said heated air in order to generate steam from water supplied to said steam generator means through water infeed means.

3,993,042
INFANT ENVIRONMENTAL TRANSITION SYSTEM

James D. Gatts, 4625 E. Louisiana, No. 201, Denver, Colo. 80222

Continuation of Ser. No. 131,126, April 5, 1971, Pat. No. 3,809,065. This application May 2, 1974, Ser. No. 466,136
The portion of the term of this patent subsequent to May 7, 1991, has been disclaimed.
Int. Cl.² A61B 19/00
U.S. Cl. 128—1 B 43 Claims



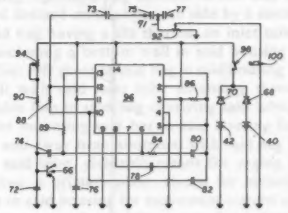
15. An environmental transition system for infants operative to simulate the intrauterine environment as sensed by the infant while in the uterus comprising: a housing for receiving said infant upon delivery having means for generating in said housing at least four of the sensory environmental conditions of sound, temperature, tactile sensation, light and motion as sensed by the infant in its intrauterine environment, and second respective means associated with said first respective means for controlling change in the intrauterine-extrauterine transition environment.

36. The method of transitioning an infant from intrauterine to extrauterine life by retaining the infant for a period of time under an optimum number of the conditions of sound, temperature, light, motion and tactile sensation simulating those same environmental conditions as sensed by the infant in the intrauterine environment, the method comprising:
a. providing a housing of internal size to receive and support the infant after delivery;
b. providing said housing with at least three of said sensory environmental conditions of sound, temperature, light, motion and tactile sensation;
c. transferring said infant to said housing after delivery; and
d. gradually conditioning said infant in said housing from the intrauterine to the extrauterine environment by gradually reducing over a period of time the time period or intensity or both to which said infant is exposed to said simulated intrauterine environmental conditions in said housing.

3,993,043
PORTABLE SLEEP INDUCER

Guy Adams, Monroe, and Scott D. Goldman, Monsey, both of N.Y., assignors to Solitron Devices, Inc., Tappan, N.Y.

Filed Aug. 21, 1975, Ser. No. 606,708
Int. Cl.² A61M 21/00
U.S. Cl. 128—1 C 13 Claims



10. An analgesic device comprising:
a housing having a pocket;
a speaker stowable in the pocket and extendable therefrom;
a means to produce analgesic sound including a semiconductor noise source and an integrated circuit amplifier characterized by N channel and P channel enhancement type MOS transistors;
a means to control sound from said integrated circuit;
a means to broadcast sound over said speaker; and,
a source of electrical energy for said means to produce analgesic sound.

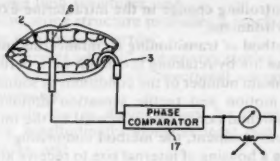
3,993,044
METHOD AND DEVICE FOR DETERMINING THE LENGTH OF A ROOT CANAL OF A TOOTH

William G. McGuffin, 38 Clearwater Drive, Willingboro, N.J. 08046

Filed Mar. 10, 1975, Ser. No. 556,667
Int. Cl.² A61B 5/05
U.S. Cl. 128—2 S 8 Claims

1. A device for locating the apex of a root canal of a tooth comprising a probe positionable within a root canal of a tooth, a first oscillator adapted to be coupled to soft tissue surrounding teeth for establishing a reference signal having a given frequency corresponding to a frequency produced by inserting the probe into the root canal and reaching the apex thereof,

a second oscillator coupled to the probe the frequency of which is determined by the position of the probe inside the root canal, means to produce a voltage proportional to the



phase difference between the frequencies of the first oscillator and second oscillators, and means responsive to said voltage to produce an indication of the position of the probe in the root canal.

3,993,045

TUBULAR MEASURING MEDICAL INSTRUMENTS

Elizabeth Edwinia Ion, 3902 Roseland, Houston, Tex. 77006

Filed Nov. 10, 1975, Ser. No. 630,324

Int. Cl.² A61B *5/10*

U.S. Cl. 128—2 S **8 Claims**

1. A set of graduated medical instruments for measuring vessels and prosthetic grafts therefor, each of said instruments comprising:

a handle member;

an elongated rod member attached to said handle member; and

a ring member attached to said rod member, said ring being of a diameter corresponding with the diameter of a selected one of said prosthetic vessel grafts.

3,993,046

SEIZURE SUPPRESSION DEVICE

Heriberto Fernandez, 1822 Gaston St., Winston-Salem, N.C. 27103, and George T. Pardue, P.O. Box 131, Pilot Mountain, N.C. 27041

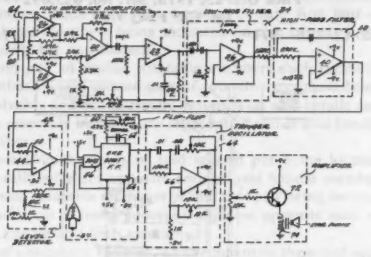
Filed Nov. 6, 1974, Ser. No. 521,402

Int. Cl.² A61B *5/00*

U.S. Cl. 128—2.1 B **17 Claims**

1. Apparatus for suppressing an epileptic seizure comprising:

electrical circuit means for receiving an EEG electrical waveform signal and producing an electrical trigger signal only when and for as long as the amplitude thereof exceeds a predetermined level with respect to a given reference level, that reference level indicating an epileptic seizure,



electrical circuit means responsive to said trigger signal for producing an oscillatory electrical signal, until said trigger signal is no longer received, and only following production of said trigger signal, and

speaker means for receiving said oscillatory signal and producing an audio signal which suppresses said seizure.

3,993,047

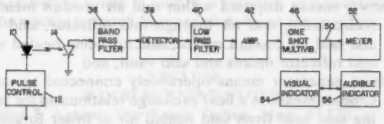
INSTRUMENTATION FOR MONITORING BLOOD CIRCULATION

Sanford C. Peek, 111 Summer St., Hingham, Mass. 02043

Continuation-in-part of Ser. No. 487,150, July 10, 1974, abandoned. This application Oct. 8, 1975, Ser. No. 620,701

Int. Cl.² A61B *5/02*

U.S. Cl. 128—2.05 P **18 Claims**



1. Compact monitor apparatus for monitoring a blood circulation condition comprising:

a source of infrared radiation,

infrared sensor means mounted in spaced, side by side relation to said infrared source, said source and said sensor means being arranged whereby, when applied to a skin surface said source and said sensor means are exposed to spaced but immediately adjacent skin surface areas,

oscillator means for energizing said infrared source to generate a series of pulses of infrared radiation at a relatively high frequency that is substantially greater than the power distribution frequency, whereby

the pulsating blood flow immediately beneath the skin surface area significantly changes the transmission of infrared radiation as a function of the amount of blood in that region and thus imposes a modulation at a relatively low frequency that is substantially less than said power distribution frequency on the amplitude of the relatively high frequency pulses of infrared radiation emanating from the skin surface as sensed by said sensor means,

band pass circuitry means connected to said sensor means and tuned to pass only signals in a frequency band that has a lower limit greater than said power distribution frequency and an upper limit less than three times said relatively high frequency, detector circuitry means connected to said band pass circuitry means for producing a series of output pulses as a function of the modulated pulse signals passed by said band pass circuitry means, low pass circuitry means, connected to said detector circuitry means and tuned to pass only signals at a fre-

quency substantially less than said power distribution frequency, such that the relatively low frequency components of the output pulses from said detector circuitry means are passed and the relatively high frequency pulse components of said output pulses are blocked,

pulse generator means connected to said low pass circuitry means to generate a pulse of predetermined amplitude and duration in response to each output pulse from said low pass circuitry means, the repetition rate of said pulse generator being limited to a maximum rate of about three pulses per second,

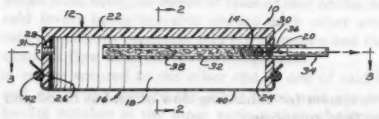
and output indicator means connected to respond to said pulses of predetermined amplitude and duration from said pulse generator means to produce an indication of the monitored blood circulation condition as a function of the modulation by said pulsating blood flow of the series of infrared radiation pulses as sensed by said infrared sensor.

3,993,048

BIOMEDICAL ELECTRODE

Howard T. Francis, Park Forest, Ill., assignor to Biomedical International Company, River Grove, Ill.

Filed Sept. 8, 1972, Ser. No. 287,562
Int. Cl.² A61B *5/04*
U.S. Cl. 128—2.06 E **5 Claims**



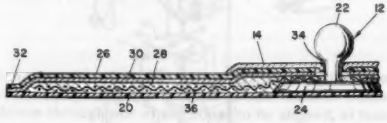
1. A biomedical electrode for taking electrical measurements of electrical signals physiologically generated by a subject, comprising, an electrical conductor adapted for connection to an instrument for making electrical measurements, a mercury calomel mixture connected to the electrical conductor, a solution of physiological saline contacting the mercury calomel mixture, and a flexible membrane retaining the solution of physiological saline and being wetted by said solution, said membrane being adapted for direct contact with a surface of the subject to allow ionic conductance through the membrane between the surface and the solution of physiological saline.

3,993,049

ELECTRODES AND MATERIALS THEREFOR

John A. R. Kater, 583 Traverse Drive, Costa Mesa, Calif. 92626

Filed Dec. 26, 1974, Ser. No. 536,335
Int. Cl.² A61B *5/04*
U.S. Cl. 128—2.06 E **14 Claims**



1. An electrode for use in measuring bio-electric events comprising, in combination:

a pliant patch of foraminated material;

a quantity sufficient to measure bioelectric events of metal salt impregnating said patch of material;

a connector having a surface formed of the metal of said metal salt in contact with said quantity of salt; and

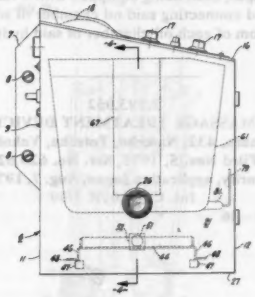
a quantity of adhesive covering one side of said patch adapted to be placed upon the skin.

3,993,050

SPIROMETER

Thomas C. Robinson, and Sotiris Kitrilakis, both of Berkeley, Calif., assignors to Searle Cardio-Pulmonary Systems Inc., Emeryville, Calif.

Filed May 19, 1975, Ser. No. 578,528
Int. Cl.² A61B *5/08*
U.S. Cl. 128—2.08 **6 Claims**



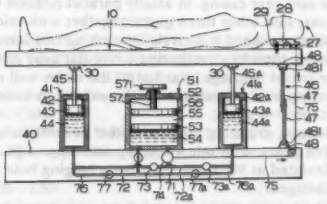
1. A spirometer comprising a housing having a side wall with an opening therein, a bag defined on one side by a first stiff sheet and defined on the opposite side by a second flexible sheet, said bag having a slit therein, an inlet tube in said bag, means including a bottom wall in said housing for supporting said first stiff sheet of said bag in said housing adjacent said side wall with said inlet tube extending through said opening, a valve flap in said bag overlying said tube, a valve bar, means for mounting said bar in said housing for movement toward and away from abutment with said bag between said slit and said tube, yieldable means for urging said bar toward said bag, a primary plate, means for mounting said primary plate in said housing for movement toward and away from said bag, a secondary plate, means for mounting said secondary plate in said housing for movement toward and away from abutment with said primary plate, and means in said housing for so moving said secondary plate.

3,993,051

BED

Shinjiro Maruyama, 15-2, Honjukucho 2-chome, Fuchu, Tokyo, Japan 183

Filed Jan. 26, 1976, Ser. No. 652,457
Claims priority, application Japan, Feb. 8, 1975, 50-016547
Int. Cl.² A61H *1/00*; **A61G** *7/00*
U.S. Cl. 128—24 R **6 Claims**



1. A bed comprising the combination of;

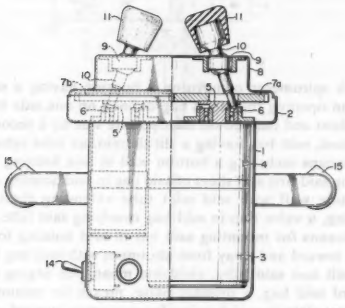
a bed frame;
a base;
a pair of hydraulic support means disposed respectively at the front and rear section of said base, each of said hydraulic support means consisting essentially of a cylinder erected vertically on said base, a piston incorporated in said cylinder, an oil chamber defined below said piston, and a piston rod the upper end of which is connected to said front or said rear section of said base;
an oil tank including a separator capable of displacement inside an airtight vessel erected on said base so as to divide it into an oil chamber and a compressed air chamber while maintaining airtightness; and
a pair of pipes, each being equipped with a variable throttle valve and connecting said oil chamber of said oil tank to the bottom of each oil chamber of said hydraulic support means.

3,993,052

MASSAGE TREATMENT DEVICE

Kazuo Miyahara, 432, Nasecho, Totsuka, Yokohama, Japan

Filed Nov. 5, 1975, Ser. No. 629,629
Claims priority, application Japan, Aug. 7, 1975, 50-96838
Int. Cl.² A61H 7/00
U.S. Cl. 128—46 **4 Claims**



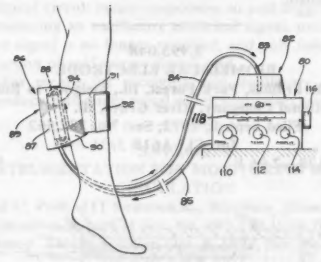
1. A massage treatment device characterized in that said device comprises;
an electric motor;
a reduction gear directly coupled to said motor, said electric motor and said reduction gear being mounted on a casing of the body proper of the device;
a gear casing provided adjacent to said casing of the body proper;
a first gear coupled to an output shaft of said reduction gear and journaled to one of bearings attached to said gear casing, said output shaft projecting in the interior of said gear casing;
other three gears journaled in other three bearings attached to said gear casing, in axially parallel relation to said first gear, said other three gears, together with said first gear, being arranged in a circle in meshing relation to adjacent gears, thereby constituting a circular gear arrangement;
four swivel bearings attached to the outer wall of said gear casing in the positions on the extension lines of axes of respective gears;
eccentric, engaging holes provided eccentrically in respective gears, with one engaging hole of one gear angularly deviated at 90° from the other engaging hole of the adjacent gear;
four operating rods journaled in said swivel bearings, respectively and having the lower ends fitted in engaging relation in said eccentric engaging holes, respectively; and,
rubber cap members fitted on the top ends of respective operating rods;
said electric motor being rotated by said first gear, thereby providing a rhythmic movement consisting of a combination of a given cycle of circular motions of respective cap members.

3,993,053

PULSATING MASSAGE SYSTEM

Murray Grossan, 8930 Sepulveda Blvd., Los Angeles, Calif. 90045

Continuation of Ser. No. 494,852, Aug. 5, 1974, abandoned.
This application Aug. 5, 1975, Ser. No. 601,927
Int. Cl.² A61H 7/00, 29/00
U.S. Cl. 128—64 **3 Claims**



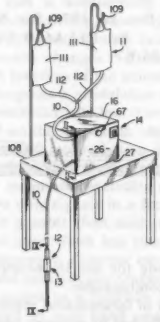
1. A system for enhancing flow of venous blood and lymphatic fluid comprising:
a set of tubing segments arranged in parallel generally adjacent relation, said tubing segments being successive corresponding parts of a coil;
applicator means for maintaining said set in contact with a patient's skin, with the tubing segments generally parallel with venous flow in the adjacent body member;
and means for forcing pulsating fluid through said tubing segments in a cardiocipetal direction.

3,993,054

THERAPEUTIC LAVAGE

Gordon Arthur Newman, Schoolcraft Township, Kalamazoo County, Mich., assignor to Stryker Corporation, Kalamazoo, Mich.

Filed June 19, 1975, Ser. No. 588,495
Int. Cl.² A61H 9/00
U.S. Cl. 128—66 **9 Claims**



1. An apparatus for effecting a therapeutic lavage, comprising:

rigid frame means;

a motor on said frame means and having an output shaft means;

partially cylindrical wall means mounted upon said frame means near said shaft means and substantially concentric therewith;

rotor means eccentrically mounted upon said shaft means radially within and spaced from said wall means, the peripheral surface of said rotor means being rotatable with respect to said shaft means, the peripheral surface of said rotor means being movable toward, along and then away from said wall means as said shaft means is rotated;

resiliently flexible tube means extending along and between the peripheral surface of said rotor means and the adjacent surface of said wall means whereby said tube means is substantially compressed with a rolling motion during each rotation of said shaft means to induce the movement of liquid through said tube means;

retainer means for releasably holding said tube means in position between said roller means and said wall means;

manually engageable nozzle means on one end of said tube means, said nozzle means having manually controllable valve means for controlling the flow of liquid therethrough, the other end of said tube means being connected to a source of liquid under pressure;

said valve means comprising a pair of levers pivotally connected to each other near corresponding ends thereof and having projections extending toward each other at points near to but spaced from said corresponding ends, said projections being on opposite sides of said nozzle means, said levers being movable toward each other whereby said projections compress said nozzle means and thereby obstruct flow of liquid therethrough; and

arm means secured to the other end of one of said levers and projecting toward the other lever, said arm means having notches in the inner surface thereof engageable with the other end of said other lever for releasably holding said levers in predetermined positions relative to each other.

3,993,055

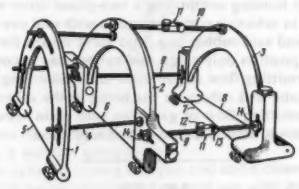
APPARATUS FOR SURGICAL TREATMENT OF BONE FRACTURES AND DISEASES

Mstislav Vasilievich Volkov, 1 Stroitelnaya ulitsa, 6, korpus 1, kv. 63, and Oganes Vardanovich Oganesian, ulitsa Pervomaiskaya, 74, kv. 87, both of Moscow, U.S.S.R.

Filed June 11, 1975, Ser. No. 586,136

Int. Cl.² A61F 5/04

U.S. Cl. 128—84 B **4 Claims**



1. An apparatus for surgical treatment of bone fractures and diseases, comprising: two pairs of needles each of which is to be driven through one of the bones to be aligned; at least two braces, the tips of said needles of one of said pairs being secured in each said brace so that the needles and the brace define a rigid system, and one pair of needles with the brace define one rigid system to be secured on one bone being aligned while the other pair of needles and the brace define a second rigid system to be secured on the other bone being aligned; two distractors interconnecting said rigid systems; guide slots formed in the ends of said opposite braces in each of said rigid systems and lying in the plane of said brace, said guide slots formed in one said brace being disposed at right angles relative to said guide slots formed in said opposite brace; sliders accommodated in said guide slots; actuators for moving said sliders along said guide slots and fixing said sliders in a required position; the ends of said distractors being coupled with said sliders.

3,993,056

ORTHOPAEDIC APPLIANCES

Pierre Rabischong, Saussan, and Jean Pierre Louis Bel, Montpellier, both of France, assignors to Institut National de la Sante et de la Recherche Medicale, Paris, France

Filed Jan. 21, 1976, Ser. No. 651,033

Int. Cl.² A61F 5/04

U.S. Cl. 128—89 R **17 Claims**

1. An orthopaedic appliance for enabling paralytics to stand erect, comprising of a flexible garment of inextensible fabric, formed of a plurality of separate garment pieces each positionable on and adjustable to envelop tightly a body portion located between two joints of a paralysed person and each garment piece having an outer portion which in use of the appliance encloses the outer side of the body part, an inflatable structure on each garment piece and including a plurality of parallel, flexible and inflatable tubes attached to said garment piece to extend substantially vertically over the said outer portion thereof, pairs of adjacent ones of said garment pieces being located on opposite sides of a body joint, in use of the appliance, a mechanical support device connecting together the garment pieces of each said pair of adjacent pieces said devide comprising two rows of rigid pins and a mechanical articulation interconnecting said rows of pins and arranged to be located at the level of the said body joint, and means for attaching each said row of pins to said inflatable structure of a respective one of said pair of adjacent garment pieces located on opposite sides of the said joint.

3,993,057

INTRAUTERINE DEVICE THAT BIOERODES IN RESPONSE TO THE ENVIRONMENT OF THE UTERUS AND METHOD OF USING

Peter W. Ramwell, McLean, Va., assignor to Alza Corporation, Palo Alto, Calif.

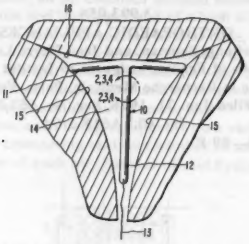
Division of Ser. No. 318,890, Dec. 27, 1972, Pat. No. 3,888,975. This application May 19, 1975, Ser. No. 578,727

Int. Cl.² A61F 5/46

U.S. Cl. 128—130 **47 Claims**

1. An intrauterine device for the controlled local administration of drug to the uterus comprising a body formed of a non-toxic bioerodible drug release rate controlling uterine

compatible material containing a uterine acceptable drug dispersed therethrough, the device shaped, sized and adapted for insertion and retention in the uterus, and wherein in operation with the device in the environment of use the release rate



controlling material is a means which bioerodes to a non-toxic material at a controlled and continuous rate over a prolonged period of time in response to the environment of the uterus, thereby releasing drug to the uterus at a controlled and continuous rate over a prolonged period of time.

3,993,058

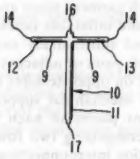
INTRAUTERINE DEVICE WITH SEEKER FOR FINDING THE CERVICAL OS AND HOUSING MEMBER FOR FITTING DEVICE IN AN INSERTER

Seymour Hoff, San Jose, Calif., assignor to Alza Corporation, Palo Alto, Calif.

Continuation-in-part of Ser. No. 499,186, Aug. 21, 1974, abandoned. This application June 23, 1975, Ser. No. 589,270

Int. Cl.² A61F 5/46

U.S. Cl. 128—130 **6 Claims**



1. An improved intrauterine device adapted for easy insertion and prolonged placement in a fertile uterus, the device consisting of a transverse member, a longitudinal member dependent upon the transverse member and suitably united thereto with the longitudinal member having a substantially uniform internal diameter, a lead end formed where the transverse and longitudinal members unite, a trailing end distant from the lead end on the longitudinal member, the improvements consisting essentially of a seeker member having a curved surface raised above the plane of the transverse member continuous with the lead end and having an external diameter substantially equal to the external diameter of the longitudinal member, and a housing member formed continuous with the trailing end of the longitudinal member and having an external diameter smaller than the diameter of the longitudinal member.

3,993,059

DEVICE FOR VENTILATING A PATIENT

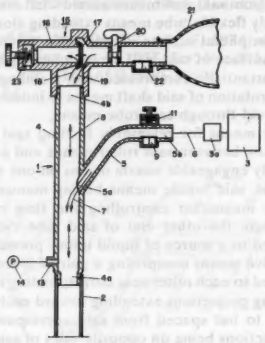
Ulf Håkan Sjöstrand, Orebro, Sweden, assignor to AGA Aktiebolag, Lidingo, Sweden

Filed Nov. 13, 1974, Ser. No. 523,409

Claims priority, application Sweden, Nov. 13, 1973, 7315392

Int. Cl.² A61M 16/00

U.S. Cl. 128—145.8 **2 Claims**



1. A device for the ventilation of a patient comprising:

an elongated main tube having a bore completely therethrough, said main tube connectable at a first end to a tube insertable into a patient;

a branch tube for conveying breathing gas from a lung ventilator gas source, said branch tube having a bore completely therethrough and attached at a first end to the mid portion of said main tube with said branch tube bore in fluid communication with said main tube bore at a valveless junction, said branch tube extending in the direction of the other end of said main tube at an acute angle with said main tube;

a three arm valve housing detachably mounted at a first arm to said other end of said main tube;

a second arm of said valve housing comprising an overpressure valve having variably adjustable opening pressure;

a rubber bag for manual ventilation being mounted on a third arm of said valve housing;

said valve housing comprising a two-phase three-way valve means in selective communication with said overpressure valve and said rubber bag, said valve means for being in a first position only when said rubber bag is compressed for permitting flow of gas from said rubber bag into said main tube and otherwise for being in the other position for permitting flow of gas from said main tube through said second arm to said overpressure valve.

3,993,060

DIVING SNORKEL WITH CONVOLUTED TUBE

Wallace F. Mitchell, Mettawa, Ill., assignor to Dacor Corporation, Northfield, Ill.

Filed Dec. 11, 1974, Ser. No. 531,454

Int. Cl.² A62B 7/12

U.S. Cl. 128—145 A **5 Claims**

1. A diving one-piece molded rubber snorkel, comprising

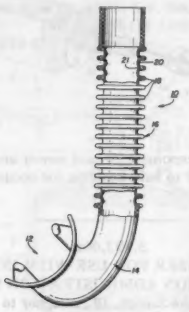
a one-piece molded rubber conduit,

a mouthpiece formed at one end of said conduit,

an intermediate flexible snorkel tube section,

said tube section including a plurality of solid rubber annular external ribs spaced apart by intermediate annular wall sections,

said wall sections being concavo-convex in cross-section with the external surface being concave, and



the interior surface of said tube being smooth to permit laminar fluid flow therethrough.

3,993,061

SYRINGE PUMP DRIVE SYSTEM AND DISPOSABLE SYRINGE CARTRIDGE

Stephen H. O'Leary, San Diego, Calif., assignor to Ivac Corporation, San Diego, Calif.

Filed Feb. 28, 1975, Ser. No. 554,230
Int. Cl.² A61M *5/20*
U.S. Cl. 128—214 F **20 Claims**

1. For use in a syringe pump having a housing and a syringe mounting, a syringe, comprising:

a hollow cylinder having an open end and a closed end, said cylinder being adapted for normal use with its longitudinal axis substantially vertical, said cylinder having a pair of integral, parallel inlet and outlet nipples projecting from said closed end of said cylinder, said nipples being disposed on opposite sides of said cylinder with the axes of said nipples being substantially parallel to said longitudinal axis of said cylinder, there being no valves within said nipples, the uppermost interior surface of said cylinder being sloped upwardly in a single plane, said outlet nipple being located adjacent the highest point within said cylinder;

a piston head with said cylinder; and

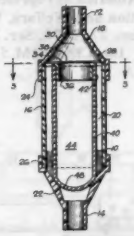
a piston rod connected to said piston head and integral therewith for reciprocating said piston head along said longitudinal axis of said cylinder.

3,993,062

HYDROPHOBIC VALVE

Thurman S. Jess, Mundelein, Ill., assignor to Baxter Laboratories, Inc., Deerfield, Ill.

Filed Nov. 3, 1975, Ser. No. 628,276
Int. Cl.² A61M *5/14*
U.S. Cl. 128—214 R **12 Claims**



1. A hydrophobic value for liquids comprising:

a. a housing defining inlet means and outlet means, each of the inlet and outlet means communicating with the housing

b. a resilient, inflatable boot mounted in the housing, said boot positioned to block the flow of liquid through the outlet means when inflated and to permit flow the liquid through the outlet means when in a deflated state, said boot including an open portion adjacent to the inlet means, and

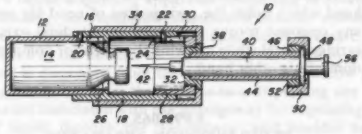
c. a hydrophobic filter element capable of repelling liquid but permitting the passage of air therethrough positioned over said open portion adjacent to the inlet means whereby liquid introduced to the housing the inlet means is passed through the housing for discharge from the outlet means and air introduced with the liquid is passed through the hydrophobic filter into the boot to stop the flow of liquid when the boot is inflated with air.

3,993,063

PROTECTIVE SHIELDING ASSEMBLY FOR USE IN LOADING A HYPODERMIC SYRINGE WITH RADIOACTIVE MATERIAL

Edward W. Larrabee, Bronxville, N.Y., assignor to Union Carbide Corporation, New York, N.Y.

Filed June 16, 1975, Ser. No. 587,179
Int. Cl.² A61M *5/00*
U.S. Cl. 128—215 **3 Claims**



1. A protective shielding assembly, suitable for use in the loading of a hypodermic syringe, adapted at one end to be connected to a protective shield surrounding a vial and at its opposite end adapted to be connected to a protective shield, surrounding the barrel of a hypodermic syringe at the needle end thereof and fixedly holding the hypodermic syringe comprising an inner sleeve, an intermediate sleeve connectable to the protective shield surrounding the vial, and an outer protective sleeve connected to said inner sleeve, said outer sleeve and said inner sleeve being in contact with and slidable with respect to said intermediate sleeve, said slidable members capable of moving the protective shield fixedly holding the

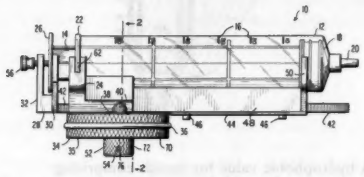
hypodermic syringe toward the vial causing penetration thereof by the needle of the hypodermic syringe.

3,993,064

ONE-HANDED SYRINGE

Charles J. McCarthy, Rockville; Steven Charles, and Daniel M. Eichenbaum, both of Bethesda, all of Md., assignors to The United States of America as represented by the Department of Health, Education and Welfare, Washington, D.C.

Filed Mar. 27, 1975, Ser. No. 563,378
Int. Cl.² A61M 5/00
U.S. Cl. 128—218 A **7 Claims**



1. A one-handed syringe free of mounting brackets for the application of suction and pressure to a patient while being held in one hand of an operator comprising:

a cylindrical syringe barrel having first and second ends, and a longitudinal axis;

a cylindrical syringe plunger, movably disposed within said syringe barrel for longitudinal movement along said longitudinal axis;

a barrel supporting means for the retention and holding of said syringe barrel;

a rotatable control wheel rotatable by fingers of the same hand which holds the syringe, having an axis of rotation and a hub, said control wheel being mounted on said barrel support means with said axis of rotation being between said first and second ends, and being substantially perpendicular to said longitudinal axis; and

drive means operatively connected between said control wheel and said syringe plunger for changing the position of said syringe plunger in said syringe barrel in response to the movement of said rotatable control wheel in either direction and allowing an operator to sense force being applied, said drive means being mounted on said barrel support means and being a rack and pinion, said control wheel being connected to said pinion which meshes with said rack to drive said rack and thereby drive said syringe plunger;

whereby suction or pressure can be applied by an operator by rotating the control wheel with fingers of the same hand which holds the syringe free of need for providing any opposed torque about the longitudinal axis of the syringe barrel while allowing the operator complete freedom of his other hand.

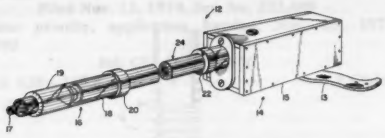
3,993,065

FLUID INFUSION APPARATUS

Anthony W. Szabo, 37 Cobblewood Road, Livingston, N.J. 07039, and Louis R. M. Del Guercio, 14 Pryor Lane, Larchmont, N.Y. 10538

Filed May 20, 1975, Ser. No. 579,232
Int. Cl.² A61M 5/00
U.S. Cl. 128—218 A **6 Claims**

1. An improved fluid infusion apparatus for an ambulatory patient of the type having a portable power and timing means mountable to the patient and received in a housing and a syringe operable thereby, said syringe comprising in part a piston, received in a cylindrical body, said apparatus for administering a predetermined amount of fluid at a predetermined rate over an extended time period, wherein the improvement comprises a flexible connecting member connecting said syringe to said power means for causing said piston of



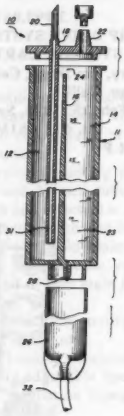
said syringe to be responsive to said power and timing means and means attached to said housing for securement to a patient.

3,993,066

BURETTE CHAMBER FOR USE WITH INTRAVENOUS SOLUTION ADMINISTRATION SET

Robert A. Virag, Lake Zurich, Ill., assignor to Baxter Laboratories, Inc., Morton Grove, Ill.

Filed Nov. 1, 1974, Ser. No. 520,062
Int. Cl.² A61M 5/14
U.S. Cl. 128—214 C **7 Claims**

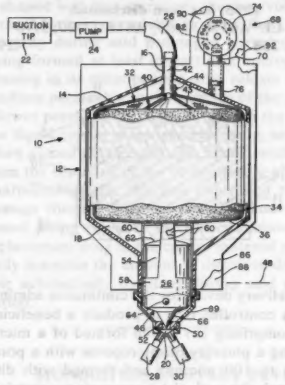


1. A burette chamber adapted to administer intravenous solution to a patient and selectively permit, during the administration of intravenous solution, the injection of medicament, comprising, in combination: an airtight container having a secondary compartment for dispensing intravenous solution, a primary compartment for automatically providing intravenous solution to the secondary compartment in response to the amount of fluid in said secondary compartment and a wall member separating said compartments; a first inlet connected to said container and communicating with said primary compartment; means for coupling said first inlet to a primary solution container; an injection site connected to said airtight container and communicating with the interior thereof for the injection of medicament into said airtight container; said wall member defining an opening for communication between said primary compartment and said secondary compartment; a tube connected to said inlet and extending downwardly therefrom to the lower portion of said primary compartment to permit the intravenous solution to be displaced up into the tube towards the primary solution container as medicament is injected through said injection site into the airtight container; and a drip chamber connected to said airtight container and forming an outlet therewith.

3,993,067
AUTOTRANSFUSION DEVICE

Eli Schachet, St. Louis, Mo., and Eugene E. Weilbacher, Columbia, Ill., assignors to Sherwood Medical Industries Inc., St. Louis, Mo.

Filed Apr. 24, 1975, Ser. No. 571,112
Int. Cl.² A61M 5/00
U.S. Cl. 128—214 C 26 Claims



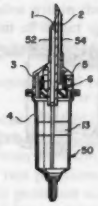
1. An autotransfusion device comprising housing means including a filtering chamber having blood filtering means therein for receiving and filtering blood supplied thereto under pressure from a patient, and a reservoir chamber in fluid communication with said filtering chamber for receiving filtered blood therefrom and having an outlet for returning the filtered blood to the patient, and pressure limiting means on said housing means for limiting fluid pressure in said chambers including adjustable pressure relief valve means connected between one of said chambers and atmosphere and adjustable to selectively provide different pressure settings each limiting the fluid pressure in said one chamber to a different selected maximum value, said valve means being responsive to fluid pressure in said one chamber to vent said one chamber to atmosphere when the fluid pressure therein exceeds the maximum value of the selected setting and seal said one chamber from atmosphere when the fluid pressure therein is below the maximum value of the selected setting.

3,993,068
PIERCING CANNULA OF INFUSION AND TRANSFUSION INSTRUMENTS

Hans-Jürgen Forberg, Lensahn, Holst., Germany, assignor to Transcodan Sven Husted-Andersen, Germany

Filed July 8, 1975, Ser. No. 594,064
Claims priority, application Germany, July 13, 1974, 2433780; June 27, 1975, 2528738
Int. Cl.² A61M 5/16
U.S. Cl. 128—214 C 11 Claims

1. A drop chamber having a piercing cannula of infusion and transfusion instruments thereon, comprising a housing having an interior liquid chamber for liquid and a closure covering said chamber with an air opening, a tubular member for liquid passage therethrough communicating with the interior of said housing and extending outwardly through said closure, means defining an aeration channel adjacent said tubular member through said closure and having a lower end with an opening in said chamber, a tubular part defining an air passage from said opening to said chamber, a valve member disposed in said chamber between said air passage and said lower end opening of said aeration channel and including a resilient portion biased against said tubular part over the air passage and regulating the air flow therethrough, said resilient

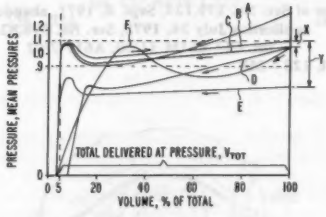


portion being of a wedge-shape configuration and said valve member includes a base portion below said resilient portion.

3,993,069
LIQUID DELIVERY DEVICE BLADDER

Richard G. Buckles, Redwood City; Harold M. Leeper, Mountain View; Su Il Yum, Sunnyvale, and Alan S. Michaels, Atherton, all of Calif., assignors to Alza Corporation, Palo Alto, Calif.

Continuation-in-part of Ser. No. 344,713, March 26, 1973, abandoned. This application Aug. 18, 1975, Ser. No. 605,690
Int. Cl.² A61M 5/00; B65D 35/18
U.S. Cl. 128—214 F 6 Claims



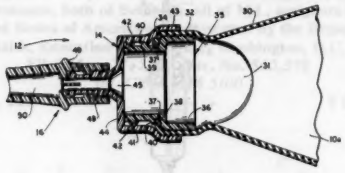
1. In a liquid dispensing apparatus comprising in combination a housing, an expansible elastomeric bladder contained within the housing for holding the liquid under pressure, the elastic force in the bladder walls providing the force by which the liquid is dispensed from the apparatus, a liquid flow passageway extending from the bladder to a dispensing site and valve means associated with the passageway for regulating the flow of liquid through the passageway, said bladder being cylindrical, having a deflated length that is not less than 5 times its deflated inside diameter, walls whose thickness is from about 0.01 to about 1 times the deflated inside diameter of the bladder, and an axial stress at 300% elongation that is not more than 1.5 times the radial stress at 300% elongation, and being formed from an elastomeric composition that has a permanent set of less than about 3% and that has a uniaxial stress/strain curve that has an ultimate elongation exceeding 400%, and a point in the range of 300% and 1000% elongation at which the slope increases significantly, the improvement wherein the elastomeric composition has a stress relaxation that does not exceed about 10% and a low frequency hysteresis that does not exceed about 10%.

3,993,070

EXPANDABLE SYRINGE

Vincent R. Sneider, 3422 Hallcrest Drive, Atlanta, Ga. 30319

Filed June 30, 1975, Ser. No. 591,612
Int. Cl.² A61M 7/02
U.S. Cl. 128—251 5 Claims



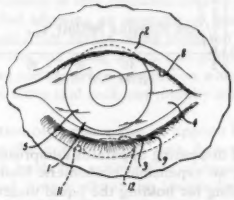
1. An expandable syringe, of the type including an elastic bag stretchable on filling with liquid under pressure, said syringe including a filling means at one end of said elastic bag, said filling means including means for receiving a spout through which said liquid under pressure is admitted to said bag and a filling valve between said means for receiving a spout and said elastic bag, said syringe including a dispensing means at the opposite end of said elastic bag, said dispensing means comprising a mouthpiece receivable in an opening in said opposite end of said elastic bag, a cap threadedly engageable with said mouthpiece and having a discharge port therein, a valve part carried by said cap in communication with said discharge port, said valve part being adapted to receive a second valve part to open and close said discharge port.

3,993,071

BIOERODIBLE OCULAR DEVICE

Takeru Higuchi; Anwar A. Hussain, both of Lawrence, Kans., and John W. Shell, Los Altos, Calif., assignors to Alza Corporation, Palo Alto, Calif.

Division of Ser. No. 179,129, Sept. 8, 1971, abandoned. This application July 24, 1975, Ser. No. 598,824
Int. Cl.² A61M 31/00; A61F 7/02
U.S. Cl. 128—260 11 Claims



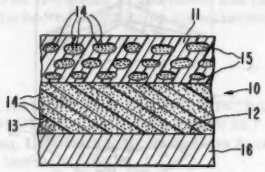
1. A bioerodible ocular device defining a means for the controlled continuous administration of a predetermined dosage of drug to the eye, comprising a body of hydrophilic bioerodible drug release rate controlling material containing a water-insoluble drug formulation confined therein, the body being of an initial shape which is adapted for insertion and retention in the sac of the eye bounded by the surfaces of the bulbar conjunctiva of the sclera of the eyeball and the palpebral conjunctiva of the lid, the body being a means for continuously metering the flow of a therapeutically effective amount of drug to the eye at a controlled rate over a prolonged period of time in the range of from 8 hours to 30 days and wherein the body bioerodes in the environment of the eye concurrently with the dispensing or at a point in time after the dispensing of the therapeutically desired amount of drug.

3,993,072

MICROPOROUS DRUG DELIVERY DEVICE

Alejandro Zaffaroni, Atherton, Calif., assignor to Alza Corporation, Palo Alto, Calif.

Continuation of Ser. No. 501,207, Aug. 28, 1974, Pat. No. 3,948,254, which is a continuation-in-part of Ser. No. 198,028, Nov. 8, 1971, abandoned, which is a continuation-in-part of Ser. No. 42,786, June 2, 1970, Pat. No. 3,854,480. This application Oct. 17, 1975, Ser. No. 623,427
The portion of the term of this patent subsequent to Apr. 6, 1993, has been disclaimed.
Int. Cl.² A61M 31/00; A61F 13/20, 5/46
U.S. Cl. 128—260 19 Claims



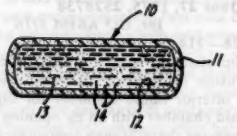
1. A drug delivery device for the continuous administration of a drug at a controlled rate to produce a beneficial result, said device comprising (a) a wall formed of a microporous material having a plurality of micropores with a pore size of 10 angstroms to 100 microns and formed with diffusional conduits through the wall, (b) a reservoir surrounded by the wall comprising a solid carrier containing dissolved and undissolved drug with the carrier permeable to the passage of dissolved drug by diffusion, (c) a medium made of a pharmaceutically acceptable release rate controlling material housed in the micropores, said drug having a solubility of 1 part drug in 10 to 15,000 parts of medium with the medium permeable to the passage of drug by diffusion but at a lower rate than through the carrier, and (d) wherein drug is metered at a controlled and continuous rate from the device by passage from the carrier and through the medium with release by the medium being the rate controlling step for releasing drug over a prolonged period of time from the device to produce the desired results.

3,993,073

NOVEL DRUG DELIVERY DEVICE

Alejandro Zaffaroni, Atherton, Calif., assignor to Alza Corporation, Palo Alto, Calif.

Division of Ser. No. 185,208, Sept. 30, 1971, Pat. No. 3,896,819, which is a continuation-in-part of Ser. No. 42,786, June 2, 1970, Pat. No. 3,854,480, which is a continuation-in-part of Ser. Nos. 812,116, April 1, 1969, Pat. No. 3,598,122, and Ser. No. 864,175, Oct. 6, 1969, abandoned. This application Mar. 3, 1975, Ser. No. 554,731
Int. Cl.² A61F 5/46, 7/02; A61M 31/00
U.S. Cl. 128—260 10 Claims



1. A delivery device for the controlled and continuous administration of drug to a body site over a prolonged period of time, said device comprising:

a. a means for containing and releasing the drug at a controlled rate comprising a reservoir containing a dissolved

drug portion and an undissolved replacement drug portion in a liquid carrier material permeable to the passage of the drug therethrough, said drug having limited solubility in said liquid carrier material; the replacement drug portion being present in an amount in excess of its solubility in the carrier material and in an amount sufficient to maintain the amount of the dissolved drug portion substantially constant during said prolonged period of time, said means further comprising:

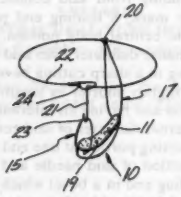
b. a shaped wall that surrounds the reservoir and is characterized by being insoluble in body fluid, maintaining its integrity during said prolonged period of time, and by being formed at least in part of a microporous polymer housing in its micropores a drug release rate controlling medium permeable to the passage of the drug but having a lower permeability to the drug than the permeability of the liquid carrier material to the drug; so that the device when placed at the body site, continuously releases drug from the reservoir of the body site at a physiologically or pharmacologically effective controlled rate by metered passage through the medium, the dissolved drug so released being replaced by the continuous dissolving of replacement drug in the carrier material so as to substantially maintain the amount of dissolved drug in the reservoir substantially constant during said prolonged time period.

3,993,074

MONOLITHIC SANITARY DEVICE

Jerome L. Murray, 652 First Ave., New York, N.Y. 10016, and Frances R. Gardiner, 43 Park Road, Sparta, N.J. 07871

Filed May 7, 1975, Ser. No. 575,203
Int. Cl.² A61F 5/44
U.S. Cl. 128—286 **17 Claims**



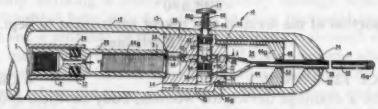
1. A monolithic sanitary device comprising an arcuate, boat-shaped structure prepared from a hydrophilic, absorbent polymeric foam material coated on one side thereof with a fluid-impervious organic polymeric latex.

3,993,075

DISPOSABLE, DEFROSTABLE CRYOSURGICAL PROBE

Wayne F. Lisenbee, Simi, and Keith E. Nelson, Los Angeles, both of Calif., assignors to Dynatech Corporation, Burlington, Mass.

Filed Dec. 24, 1975, Ser. No. 644,162
Int. Cl.² A61B 17/36
U.S. Cl. 128—303.1 **7 Claims**



4. A disposable probe comprising

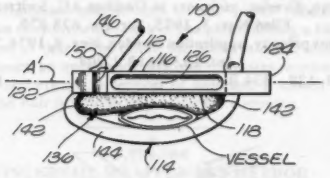
A. a housing;
B. a hollow probe tip projecting from the housing;
C. a pressurized, room-temperature, liquid refrigerant supply in the housing;
D. a capillary tube for conducting refrigerant from the supply into the tip;
E. a two position valve within the housing;
F. an exhaust conduit of larger diameter than the capillary tube for conducting refrigerant between the tip and the valve;
G. means for conducting liquid refrigerant from the supply to the valve;
H. a vent conduit communicating between the valve and the atmosphere, and
I. means accessible from without the housing for moving the valve between its two positions,
   1. in one of which positions said valve connects the exhaust conduit to the vent conduit whereby refrigerant flows into the tip through the capillary tube and exhausts from the tip through the exhaust and vent conduits expanding in the process and thereby cooling the tip, and
   2. in the other of which positions the valve connects the conducting means to the exhaust conduit and isolates the exhaust conduit from the vent conduit so that refrigerant from the supply flows through the exhaust conduit in reverse into the tip still under supply pressure and thereby floods the tip with room temperature refrigerant which warms the tip.

3,993,076

VESSEL OCCLUDING INSTRUMENT

Thomas J. Fogarty, 770 Welch Road, Palo Alto, Calif. 94304

Continuation-in-part of Ser. No. 389,922, Aug. 20, 1973, Pat. No. 3,880,166. This application Apr. 21, 1975, Ser. No. 569,907
Int. Cl.² A61B 17/12
U.S. Cl. 128—325 **10 Claims**



1. A vessel occluding instrument which includes an elongated body member having top and bottom surfaces, opposed sides, and first and second opposed ends; a first length of resilient tape extending from adjacent the first end of said body member; and means at the second end for releasably holding said first length of tape in a selected adjusted position relative to said bottom surface said bottom surface including resilient pad means secured to the bottom surface of the body member extending from substantially one side to the other side, and from the first end to adjacent the holding means at the second end providing opposed resilient occluding means.

3,993,077

METHOD AND APPARATUS RELATING TO THE PRACTICE OF ACUPUNCTURE

Sung S. Kim, 6110 Manchester, Fort Wayne, Ind. 46815

Filed Dec. 26, 1974, Ser. No. 536,543
Int. Cl.² A61B 17/34
U.S. Cl. 128—329 A **5 Claims**

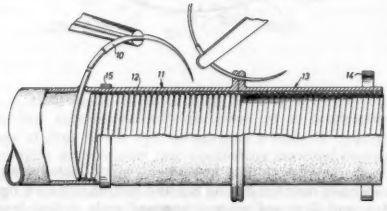
1. An acupuncture needle comprising; a pair of prongs having opposed pointed tips at one end, said tips adapted to be implanted into a selected region of a human or animal body, a handle connected to the other end of said prongs, said prongs including portions diverging outwardly in a direction away from said handle and toward said pointed tips, a frangible keeper member slidable on said handle and having a region engaging said diverging portions of said prongs whereby advancing of the keeper member along said diverging portions toward said pointed tips will move said pointed tips of the prongs toward each other while maintaining them spaced from each other, and means for latching said keeper member in advanced position along said prongs, said keeper member adapted to be destroyed for removing the acupuncture needle after it has been implanted into a selected region thereby preventing further use of the needle.

3,993,078

INSERT FOR USE PREFERABLY IN VASCULAR SURGERY

Sven Erik Bergentz, and Kurt Sven Theodore Strid, both of Malmo, Sweden, assignors to Gambro AG, Switzerland

Filed Nov. 3, 1975, Ser. No. 628,070
Claims priority, application Sweden, Nov. 4, 1974, 7413811
Int. Cl.² A61B 17/04
U.S. Cl. 128—334 R **10 Claims**



1. An insert for use in vascular surgery comprising an unperforated, hollow body of substantially circular cross-section, said body having a spiral line of fracture extending about the periphery thereof and defining continuous spiral coils to thereby weaken the cohesion of said body along the spiral coils for disassembling said body into an elongated thread.

3,993,079

DEVICE FOR PERCUTANEOUS PARACENTESIS, INJECTION, DRAINAGE AND CATHETERIZATION

Carlos Alberto Henriques de Gatztañondo, Torre 17, Barcelona, Spain

Filed Nov. 28, 1975, Ser. No. 636,214
Claims priority, application Spain, Dec. 14, 1974, 208409
Int. Cl.² A61B 17/34
U.S. Cl. 128—347 **4 Claims**

1. A device for percutaneous paracentesis, injection, drainage and catheterization, of the type comprising a hypodermic needle having a connecting portion at one end for attachment to a syringe, wherein said hypodermic needle has a central body portion extending from said connecting portion and having a reference mark, a leading end portion serving as continuation of said central body portion, said leading end portion being of smaller diameter than said central body portion and terminating in a sharp cutting bevel and surrounded by a trocar being slightly shorter in length than said needle central body portion and having an internal diameter slightly larger than the external diameter of said central body portion and having a connecting portion at one end for attachment to said connecting portion of said needle and being terminated at its other or leading end in a bevel which is not as sharp as said needle bevelled end, and having an external cutting edge and an internal blunt edge, and having a graduated scale rising in value from said leading end towards said one end, said scale being related to the total length of said needle, so that when said needle is inserted in said trocar, with the latter mounted around said needle central body portion, the trocar is movable lengthwise toward the leading end of said needle, so that when the leading ends of said needle and said trocar are mutually aligned, said reference mark on said needle central body portion is located at the level of the rear edge of the trocar.

3,993,080

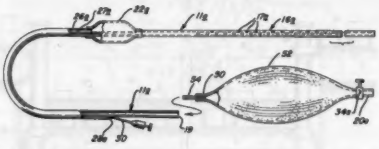
SUCTION TUBE AND RETROGRADE FLUSHING FOR WOUNDS, BODY CAVITIES AND THE LIKE

Herbert S. Loseff, 308 Woodley Road, Winnetka, Ill. 60093

Continuation-in-part of Ser. No. 447,316, March 1, 1974, Pat. No. 3,908,664. This application July 24, 1975, Ser. No. 598,890
The portion of the term of this patent subsequent to Sept. 30, 1992, has been disclaimed.
Int. Cl.² A61M 27/00
U.S. Cl. 128—350 R **6 Claims**

1. In a drainage device for wounds, body cavities, and the like, said device comprising an elongated tubular drainage member having a central lumen, and a plurality of drainage ports defined along a first portion of the length of said tubular member and through said tubular member for fluid communi-

cation between said lumen and the exterior of said tubular member, the improvement comprising, in combination, an elastomeric retention balloon carried by a second portion of said tubular member located to one side of one end of the first portion, and adapted to be inflatable under the skin of a patient when said first portion is properly positioned in a wound, said tubular member also carrying means for inflating and deflating said retention balloon, a length of severable imperforate tubing extending from the end of said first portion and having a terminus adapted for screw connection to an awl, said imperforate length of tubing permitting selective connec-



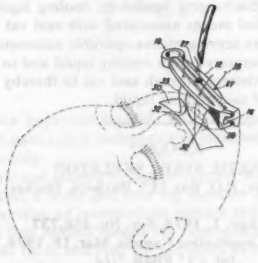
tion to an awl without contamination of the drainage ports in said first portion, an enlarged-lumen portion in communication through the central lumen with the drainage ports and for use as a combination squeeze pump and storage portion for retention of a flushing solution therein, means for selectively sealing said enlarged-lumen portion so that squeezing said squeeze pump operates to back flush solution through the drainage ports, and the means for inflating and deflating the retention balloon being a second tube that is secured along its length to said tubular member and extends along said tubular member from said retention balloon toward said enlarged-lumen but terminating spaced from said enlarged-lumen.

3,993,081

ENDOTRACHEAL TUBE HOLDER

George A. Cussell, Columbus, Ga., assignor to Swesco Inc., Tucker, Ga.

Filed Jan. 23, 1975, Ser. No. 543,472
Int. Cl.² A61M *16/00, 25/02*
U.S. Cl. 128—351 5 Claims



1. An endotracheal tube holder comprising, in combination, a clamp defining a primary passageway through which an endotracheal tube may be placed in snug frictional engagement and a plurality of secondary passageways through which tying means may be passed; a strip of adhesive tape adapted to be secured to human skin and having a plurality of holes through which the tying means may also be passed; and elongated flexible tying means passing through said clamp secondary passageways and through said tape holes and securing said clamp to said tape, said tape being the sole means adapted to be secured to human skin.

3,993,082

TOBACCO SUBSTITUTE

R. Hugo Martin; William F. Owens, Jr., both of Pisgah Forest, and Stuart W. McCarty, Brevard, all of N.C., assignors to Olin Corporation, Pisgah Forest, N.C.

Continuation of Ser. No. 395,643, Sept. 10, 1973, abandoned. This application May 5, 1975, Ser. No. 574,313
Int. Cl.² A24B *15/02*
U.S. Cl. 131—2 13 Claims

9. A smoking article comprising a smoking charge of tobacco intimately blended with a tobacco substitute for reducing the total particulate matter and vapor phase yields in the smoke therefrom to an extent greater than that expected from substitution of tobacco by an inert filter means in equivalent amounts, said tobacco substitute characterized by the smoke produced having an acrolein/tar ratio of about 3.18×10^{-3} and an organoleptic effect similar to natural tobacco smoke, said substitute consisting of a shredded, combustible paper sheet of pulped natural organic cellulose fibers and finely pulverized carbon filler, said cellulose fibers constituting a sufficient amount of the weight of the sheet to enable sheet formation and handling during conventional paper making operations, said sheet containing at least 55% by weight carbon filler based on the weight of the cellulose fibers therein.

3,993,083

GUIDE FOR TRIMMING HAIR

Antonia Torres, 121 W. 72nd St., New York, N.Y. 10023

Filed June 13, 1975, Ser. No. 586,635
Int. Cl.² A45D *24/36*
U.S. Cl. 132—45 R 1 Claim

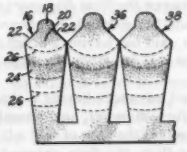
1. A guide for trimming hair and comprising a pair of congruent rectangular plates, both of the plates substantially longer than they are wide, each of the plates having a like first edge hinged to that of the other, the plates movable about the hinge between an open mode wherein the plates receive sandwiched therebetween a section of hair and a closed mode wherein the hair is held in alignment for trimming.

3,993,084

FINGERNAIL WRAPPER AND METHOD

Carol Cullen, 8445 Allenwood Road, Los Angeles, Calif. 90046

Filed Nov. 1, 1974, Ser. No. 519,808
Int. Cl.² A45D *29/00*
U.S. Cl. 132—73 8 Claims



1. A fingernail wrapper designed for remaining on a nail

after a manicure is completed comprising a thin flexible sheet of tissue which includes:

a. a rear portion adherable to the upper surface of the nail adjacent its base and having opposite first side boundaries not extending over the skin next to the nail base;

b. forwardly divergent intermediate portion forming a forward extension of said rear portion and having second side boundaries flared out relative to said first side boundaries to overlap the side edges of the nail substantially at the points where they begin to protrude forwardly from the finger, said intermediate portion being adherable to the upper surface of the nail adjacent its tip and to the lower surface of the nail adjacent its side edges; and

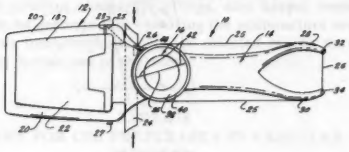
c. a front portion forming a forward extension of said intermediate portion and adherable to the lower surface of the nail adjacent its tip, whereby a tissue coating is provided for the upper and lower surfaces and terminal edge of the nail.

3,993,085

DENTAL FLOSS APPLICATOR

Edward T. Skinner, 2323 N. Monroe, Hutchinson, Kans. 67501

Filed June 23, 1975, Ser. No. 589,146
Int. Cl.² A61C *15/00*
U.S. Cl. 132—92 A **2 Claims**



1. In a dental floss applicator having an elongated fork member, fork arms holding the floss therebetween, the fork member and fork arms inserted into the mouth for scrubbing the teeth with the floss, the improvement comprising:

a. a substantially rectangular shaped handle attached to the elongated fork member;

b. a "U" shaped collar formed around the periphery of said handle, said handle receiving a substantially rectangular shaped floss dispenser inside said collar and compressed against the sides thereof;

c. a slidable tension bar disposed inside said handle and positioned between the floss dispenser and the fork arms, the ends of said bar extending outwardly from the sides of said handle, said bar having a notch therein for receiving the floss as it is fed from the dispenser to the forked arms;

d. a thumb wheel advancer having a shaft attached to the front of the fork member, said thumb wheel advancer having a slot across the face of said advancer for securing the end of the floss, the floss wrapped around said shaft as the wheel advancer is turned; and

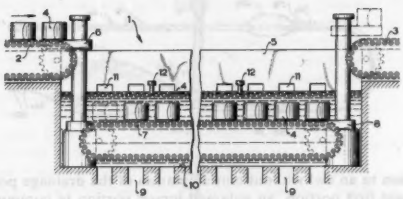
e. a floss cutter attached to said handle for cutting the used floss when the floss is removed from said shaft.

3,993,086

DEVICE FOR COOLING BAND COILS IN HOT ROLLING STRIP MILLS

Wilhelm Nellen, Holzen; Wolfgang Fabian, and Theodor Sevenich, both of Dortmund, all of Germany, assignors to Hoesch Werke Aktiengesellschaft, Dortmund, Germany

Continuation of Ser. No. 332,430, Feb. 14, 1973, abandoned.
This application Nov. 25, 1974, Ser. No. 527,066
Claims priority, application Germany, Feb. 15, 1972, 2207026
Int. Cl.² B08B *3/04*
U.S. Cl. 134—57 R **1 Claim**



1. An arrangement for cooling hot rolled steel bands reeled into coils, especially hot rolled wide strips, which includes: a vat adapted to receive and contain a cooling liquid bath, feeding conveyor means operable to receive hot rolled steel bands reeled into coils about a central axis and to feed the same with the axis of each coil in substantially vertical position to said vat at one end, first transferring means at said one end of said vat, including a lifting device operable to lower the coils with the axis of each coil in vertical position from said feeding conveyor means into said vat, a plurality of longitudinal transporting means arranged within said vat for receiving the coils from said first transfer means and transporting the same with the axis of each coil in vertical position through said vat, withdrawing conveyor means for conveying cooled coils away from said vat at the opposite end, second transferring means at said opposite end of said vat including a lifting device operable to lift the coils with the axis of each coil in vertical position for transferring uniformly cooled coils from said transporting means onto said withdrawing conveyor means, said vat being provided with fluid inlet means for admitting cooling liquid into said vat and also being provided with fluid outlet means for discharging heated-up cooling liquid from said vat, and control means associated with said vat and including temperature sensing means operable automatically to ascertain the temperature of the cooling liquid and to control the speed of flow thereof through said vat to thereby control the temperature of said cooling liquid.

3,993,087

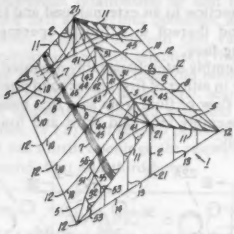
KINETIC STEEL SKELETON

Sebastian Mollinger, P.O. Box 157, Roxboro, Quebec, Canada H8Y 3E9

Filed Apr. 1, 1974, Ser. No. 456,737
Claims priority, application Canada, Mar. 18, 1974, 195242
Int. Cl.² E04B *7/14*
U.S. Cl. 135—3 R **7 Claims**

1. A kinetic steel skeleton for a building for the attachment of modular and flexible covers, comprising opposed vertical center columns extending above a surface and secured to said surface in a hinge manner, a hinge connection secured to a top end of said columns and connected to a respective end of a flexible ridge beam supported therebetween, a plurality of spaced apart main cables extending parallel to each other and secured at one end to said ridge beam and at an opposite end to respective foundation anchorage points on said surface, a set of diagonal wire rope stabilizers each of which is secured at one end to a respective one of the center columns top end and extends to an opposed corner of the building where it is

secured on said surface, a set of horizontal wire rope stabilizers secured to and extending between aligned pairs of main cables in a common vertical plane with a respective pair of said main cables, a set of wire rope polygons secured to and extending from each said top end of each said vertical center columns to a respective anchoring corner of the building in an



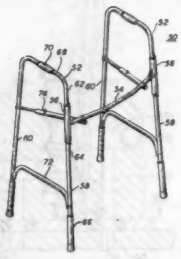
inclined plane a plurality of spaced apart strut members secured to and extending from each of said polygons to a respective end one of said main cables to hold in position said end main cables to maintain said end main cables substantially in a vertical plane, said skeleton being adapted to receive flexible covers.

3,993,088

FOLDING WALKER

Morton I. Thomas, Nyack, N.Y., assignor to Temco Products, Inc., Passaic, N.J.

Filed Sept. 15, 1975, Ser. No. 613,698
Int. Cl.² F16M *13/08*
U.S. Cl. 135—67 **10 Claims**



1. An improved foldable walker adapted to fold to a collapsed state and to unfold to a rigid unfolded state, said walker comprising:

a first and second U-shaped support, each support having at least a front and rear leg member each including a top portion, an intermediate portion and a lower portion, and a first joining means for connecting the top portions of the front and rear leg members of each of said first and second supports;

a transversely disposed bar having leg embracing means at each end thereof for pivotally joining the front leg members of said supports one to the other;

a first and a second telescoping member each having one end thereof pivotally connected to said transversely disposed bar and each having at the other end thereof a flattened end attached to the rear leg members of said first and second supports respectively by an attaching means comprising a rivet-like means connecting said flattened ends of said first and second telescoping members to the rear leg members of said first and second supports, respectively, which allows said telescoping members to turn slightly with respect to said rear leg members when said walker is folded from said unfolded to said folded state and vice versa; and,

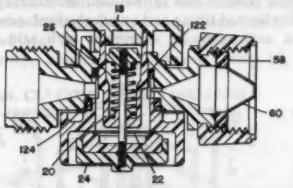
a first locking means for locking said telescoping members in an extended state.

3,993,089

FLOW CONTROLLER DEVICE

Melvin F. Hinton, and Davies Allport, both of La Jolla, Calif., assignors to Reed Irrigation Systems, El Cajon, Calif.

Filed Oct. 17, 1975, Ser. No. 623,396
Int. Cl.² F16K *45/00, 5/12*
U.S. Cl. 137—116.3 **7 Claims**



1. A controller device for fluid systems comprising:

a body member with a central bore and having an inlet portion adapted for connection with a fluid supply, said inlet portion including an inlet opening to said bore, and an outlet portion with an outlet opening from said bore and adapted for connection with a drip irrigation conduit having emitter means that are operable at a pressure level less than said fluid supply;

a rotatable spool member extending within said central bore of said body member, having handle means fixed to one end thereof and having a variable portion positioned for registry with said inlet opening to cover and close the opening to an increasing extent as the handle means is rotated in one direction, said bore and spool member forming an internal fluid chamber communicating with said outlet and normally with said inlet, said chamber having an opening at one end;

a movable valve means attached to the other end of said spool member and having means forming a closure for said chamber opening, said movable valve means including bias means urging its closure means to a preselected degree toward a closed position over the chamber opening, so that at a preselected pressure level within said internal chamber the valve means moves to an open position to allow the escape of fluid from said chamber; whereby said handle means can be turned to decrease the flow through said inlet opening and thus the pressure within said chamber until said valve closure means remains closed so that fluid is supplied through said outlet opening to said emitter means at substantially the preselected pressure level.

3,993,090

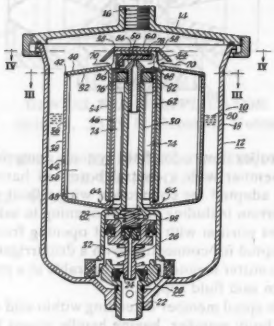
AUTOMATIC VALVING DEVICE

Paul M. Hankison, c/o Hankison Corporation 1000 Philadelphia St., Canonsburg, Pa. 15317

Filed Jan. 29, 1975, Ser. No. 545,013
Int. Cl.² F16T *1/20*
U.S. Cl. 137—195 **4 Claims**

1. In an automatic valving device, the combination comprising a container, an exhaust valve mounted in a lower portion of said container, means for actuating said exhaust valve, a pilot valve mounted in an upper portion of said container and operably coupled to said actuating means, an upstanding relatively rigid conduit positioned within said container in fluid communication with said pilot valve and said actuating means, an annular float slidably mounted on said conduit, said

float being movable along a length of said conduit between an upper pilot valve opened position and a lower pilot valve closed position, a first annular magnetic member rigidly mounted on said float and loosely encircling said conduit, a second annular magnetic member, at least one of said magnetic members being magnetized, said pilot valve including an elongated valve member having an end portion thereof inserted into an upper end of said conduit, said valve member having a valving passage extending therethrough in communication with an interior of said conduit and having its upper end portion projecting from said conduit upper end, said second magnetic member loosely surrounding said valve member and being loosely confined thereon by said conduit upper end and by projection means on said valve member and spaced from said upper conduit end so that said second magnetic member is free for limited tilting and angularly displacement for proper physical and magnetic alignment with said first magnetic



member, said magnetic members being shaped for magnetically attractive engagement therebetween at said lower float position and being disposed so as to effect such engagement to determine said lower float position, said engagement at upper liquid levels in said container providing a superbuoyancy of said float and further providing a snap action for said float upon removal thereof from said lower position toward said upper position, stop means mounted on said float and spaced from said magnetic members at said lower float position but engageable with said second magnetic member to determine said upper float position, a valve closure for said pilot valve loosely mounted on said float, a foraminous enclosure mounted on said float and loosely surrounding said valve closure so that said valve closure is freely alignable with said valve member in the closed condition of said pilot valve, and said first magnetic member being so positioned on said float as to remove said valve closure from said valve member at an intermediate position of said float.

3,993,091

MANIFOLD AND VALVE SYSTEM

Stanley M. Loveless, Oshtemo Township, Kalamazoo County, Mich., assignor to General Gas Light Company, Kalamazoo, Mich.

Filed Oct. 6, 1975, Ser. No. 619,815

Int. Cl.² F16K *11/02, 77/00;* **F15C** *3/04*

U.S. Cl. 137—269 **14 Claims**

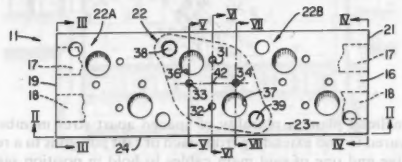
1. A fluid control apparatus, comprising in combination:

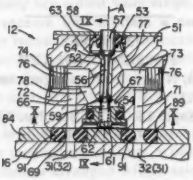
manifold means comprising a manifold member having first, second, third and fourth flow passages formed therein, said manifold member also having an exterior mounting face formed thereon;

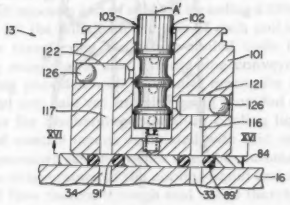
said first passage being adapted for connection at one end thereof to a source of fluid and communicating with a first opening formed in said mounting face, said second passage being adapted for exhausting the fluid from one end thereof and communicating with a second opening formed in said mounting face;

said third passage terminating at one end thereof in a first load port adapted for connection to an external load and terminating at the other end thereof in a third opening formed in said mounting face, said fourth passage terminating at one end thereof in a second load port adapted for connection to an external load and terminating at the other end thereof in a fourth opening formed in said mounting face;

a valve assembly interchangeably mounted on said manifold member in either of first and second positions for controlling the flow of fluid from said first passage through said valve assembly into said third and fourth passages, respectively;







said valve assembly including a valve hosing having an exterior support face thereon disposed directly opposite and adjacent said mounting face when said valve assembly is mounted on said manifold member, said valve housing having at least first, second and third passageways formed therein which respectively terminate in first, second and third holes at said support face;

said valve assembly also including valve means movably supported in said valve housing for controlling the flow of fluid between said passageways, said valve means being normally maintained in the first location preventing flow between said first and third passageways while permitting flow between said second and third passageways, said valve means being movable into a second location permitting flow between said first and third passageways while preventing flow between said second and third passageways;

said third and fourth openings as formed in said mounting face being disposed on opposite sides of and equally spaced from the midpoint of a line joining said first and

second openings;

said first and second holes as formed in said support face being spaced apart by a distance equal to the spacing between said first and second openings, and said third hole being spaced from and positioned relative to said first and second holes in a manner identical to the distance and positional relationship of said third opening relative to said first and second openings; and

connecting means coacting between said valve assembly and said manifold member for selectively fixedly connecting said valve housing to said manifold member in either (1) said first position wherein said first, second and third openings are respectively aligned with said first, second and third holes, or (2) said second position wherein said first, second and fourth openings are respectively aligned with said second, first and third holes.

3,993,092

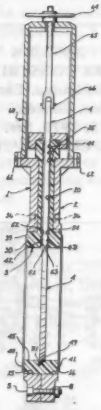
GATE VALVE WITH REPLACEABLE LINER

Robert C. Still, Tucson, Ariz., assignor to New Concepts, Inc., Tucson, Ariz.

Filed Sept. 17, 1975, Ser. No. 614,350

Int. Cl.² F16K *3/02*

U.S. Cl. 137—454.2 **10 Claims**



1. A gate valve having a positionable gate disposed therein for regulating the flow of fluid intermediate an attached pair of pipes, said gate valve comprising:

a. a gate having opposing surfaces and being positionable within said gate valve for effecting regulation of the flow of fluid;

b. a pliant liner molded in one piece for receiving, guiding and seating said gate, said liner including

i. a chest having a gate passageway with opposing sidewalls spaced from the opposing surfaces of the gate disposed therebetween;

ii. a ring defining a bore and extending downwardly from said chest in general planar alignment therewith;

iii. a depression disposed within said bore for defining a seat for said gate;

iv. first seal means disposed near the bottom of the opposing sidewalls within said chest and being in sealing contact with the gate for preventing a flow of fluid through said gate passageway intermediate said chest and said gate; and

v. further seal means disposed within said depression for preventing a flow of fluid through the bore of said ring on seating of said gate within said depression;

c. a pair of castings for receiving said liner, each of said castings including

i. a bore for receiving a part of said ring;

ii. a recess for receiving a part of said chest; and

iii. attachment means for securing said pair of castings to one another to at least partially enclose said liner therebetween;

whereby, said liner negates the need for segregable elements to effect guiding, seating and sealing of said gate within said gate valve.

3,993,093

NON-RETURN VALVE

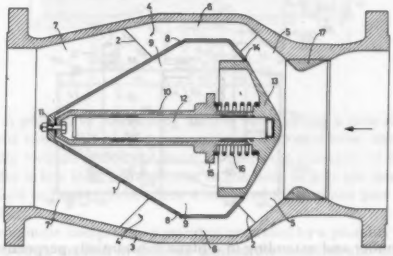
Nicolaas Jacobus Mokveld, Reeuwijk, Netherlands, assignor to Machinefabriek Mokfeld B.V., Gouda, Netherlands

Filed May 30, 1975, Ser. No. 582,201

Claims priority, application Germany, June 12, 1974, 2428519

Int. Cl.² G05D *16/10*; F16K *21/00*

U.S. Cl. 137—484.6 **2 Claims**



1. A non-return or check valve in the form of a piston-type slide-valve comprising a substantially rotationally symmetrical outer housing, a substantially rotationally symmetrical inner housing arranged co-axially within said outer housing, said inner housing being of streamlined configuration, the outer surface of said inner housing and the inner surface of said outer housing defining therebetween an annular space serving as a flow passage, connecting webs aligned with the axis of said housings extending between said housings and maintaining the same in predetermined relative position, a valve seat in said outer housing, a piston member in said inner housing, spring means yieldingly urging said piston member toward said seat in a direction opposite the direction of flow in said passage, said valve being characterized in that the shape of said flow passage is such that the velocity of the flow medium passing therethrough is accelerated at an upstream position within said passage to define a region of high pressure and is decelerated at a downstream position within said passage to define a trailing region of lower pressure, said inner housing including through-going aperture means in registry with said region of lower pressure, said aperture means comprising the sole open passage to the interior of said inner housing, whereby the pressure within said inner housing is constantly below the pressure in said region of high pressure in the unseated position of said piston against said valve seat.

3,993,094

REMOVABLE RESERVOIR COVER HAVING INTERNAL PARTS OF RESERVOIR MOUNTED THEREON

Ronald E. Spooner, Richton Park, Ill., assignor to Allis-Chalmers Corporation, Milwaukee, Wis.

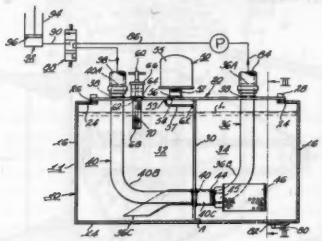
Filed Apr. 21, 1975, Ser. No. 570,198

Int. Cl.² F16K *24/00*

U.S. Cl. 137—588 **12 Claims**

1. In combination, a hollow reservoir tank for a hydraulic fluid or the like, said reservoir tank having an enlarged open-

ing on one side thereof, a detachable cover member for said opening, a suction conduit passing through and rigidly secured to said cover member and extending into the interior of said reservoir tank when said cover member is in covering relation to said opening whereby to withdraw hydraulic fluid from said reservoir tank, a return conduit passing through and rigidly secured to said cover member and extending into the interior of said reservoir tank when said cover member is in covering relation to said opening whereby to introduce hydraulic fluid into said reservoir tank, said suction conduit and said return conduit projecting beyond the normally outer surface of said cover member and being adapted to be connected into a hydraulic circuit external of said reservoir tank, said suction conduit and said return conduit due to their rigid connection to said cover member being removable from said reservoir tank along with said cover member when said cover member is removed from said reservoir tank, and a baffle member rigidly secured to the normally inner surface of said cover



member and extending in a plane substantially perpendicular to the major plane of said cover member, whereby to divide said reservoir tank into first and second chambers lying on opposite sides of the major plane of said baffle member when said cover member is in covering relation to said opening, said baffle member being constructed to permit fluid communication between said chambers, one of said conduits passing from its rigid connection to said cover member first through said first chamber, thence through said baffle member, and thence into said second chamber when said cover member is assembled on said reservoir tank, the other of said conduits passing from its rigid connection to said cover member first through said second chamber, thence through said baffle member and thence into said first chamber when said cover member is assembled on said reservoir tank, and means rigidly securing each respective conduit to said baffle member in the respective regions where said respective conduits pass through said baffle member.

3,993,095

POSITIVE PRESSURE RESUSCITATOR

Stephen Donald Flynn, 7410 Manion Road, Mississauga, Ontario, Canada

Filed Dec. 27, 1973, Ser. No. 428,823
Int. Cl.² A62B 7/02
U.S. Cl. 137—596.1 **1 Claim**

1. Apparatus for the administration of gases, such as for resuscitation, inhalation or the like, said apparatus comprising;

chamber means adapted to communicate with a face mask or the like for administration of gas;

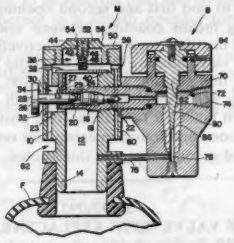
gas delivery means for delivering said gas into said chamber;

valve means for intermittently discontinuing delivery of gas thereto;

vent opening means communicating with said chamber, and having closure means therefore, intermittently operable to open and close said vent opening means whereby to permit intermittent exhalation through said chamber and vent opening means;

pressure relief means communicating with said chamber for venting the same to atmosphere in the event of an overpressure developing therein, and,

bypass connection means communicating with said gas delivery means, and bypass conduit means communicating between said bypass connection means and said chamber means, and manually operable bypass valve means for controlling flow of gas through said bypass conduit means, whereby to permit bypass flow of gas into said chamber means without restriction by said valve means.

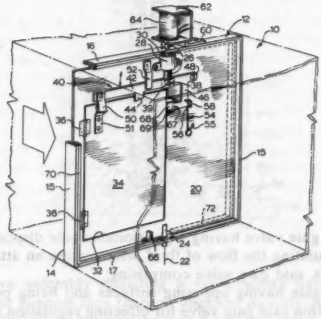


3,993,096

DAMPER CONSTRUCTION

Wilfred W. Wilson, Mississauga, Canada, assignor to K.S.H. Canada Ltd., Bramalea, Canada

Filed July 15, 1975, Ser. No. 596,080
Int. Cl.² F16K 11/10
U.S. Cl. 137—599.2 **9 Claims**



1. A damper for air ducts, comprising:

frame means,

a panel rotatable between a closed position and an open position about an intermediate axis fixed with respect to the frame means,

the panel having, mainly to one side of said axis, a window adapted to be closed and opened by a flap pivoted to said panel, the panel being such that any air pressure differential across said panel exerts a turning moment on the panel portion to said one side of said axis which is greater than that exerted on the panel portion to the other side when the window is closed, and is less when the window is open, and

flap control means selectively switchable to allow the flap to act as a one-way valve in one direction across the panel, or as a one-way valve in the opposite direction across the panel.

3,993,097

OIL/WATER PIPELINE INLET WITH OIL SUPPLY VIA A LARGE CHAMBER

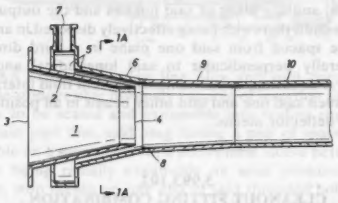
Eke Verschuur, Amsterdam, Netherlands, assignor to Shell Oil Company, Houston, Tex.

Division of Ser. No. 463,007, April 22, 1974, Pat. No. 3,865,136, which is a division of Ser. No. 217,486, Jan. 13, 1972, Pat. No. 3,822,721. This application Nov. 4, 1974, Ser. No. 520,317

Claims priority, application Netherlands, Apr. 29, 1971, 7105971

Int. Cl.² F17D 1/16

U.S. Cl. 137—604 2 Claims



1. Apparatus for transporting a viscous oil through a pipline by the introduction of a surrounding annular layer of water about the oil without the occurrence of oil drop formation within the water layer, comprising, a first chamber bounded by a wall formed by part of the curved surface of a cone and having an oil inlet and an oil exit, a second chamber positioned to surround and have a common wall with the first chamber, the second chamber having an outside conical wall provided with a water inlet and tapering down to annular water outlet, and a conical connecting piece connecting the water outlet of the second chamber with the pipeline, the taper of the connecting piece being less than the taper of the first and second chambers.

3,993,098

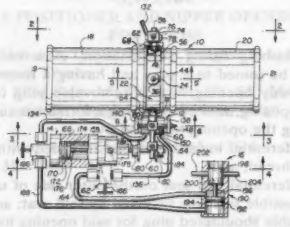
TIME CYCLE ACTUATOR

Robert E. Meynig, 2609 Sheraton, Denton, Tex. 76201

Filed Nov. 17, 1975, Ser. No. 632,341

Int. Cl.² G05D 7/00

U.S. Cl. 137—624.14 9 Claims



1. In a time cycle actuating valve: first and second chambers adapted to hold a liquid therein; flow control means connecting said chambers adapted to allow said liquid to flow between first and second chambers, support means; a shaft pivotally securing said first and second chambers to said support means such that the fluid moves by gravity to move said first and second chambers and said shaft; a valve body having an inlet and a first and second outlet; a valve element slideably disposed in said valve body and arranged to move between a first position to allow pressure from the inlet to pass through the first outlet to a second position to allow pressure to pass from the inlet to the second outlet; means to move the valve element from a first position to a second position; means secured to said shaft to actuate said means to move the valve element from a first position to a second position; reset means adapted to alternately move the first and second chambers to a lower position to reverse flow of fluid in said chambers upon activation of the valve element to the opposite position; actuated means; and means connecting the first and second outlets of said valve body to the actuated means.

3,993,099

PLUG VALVES

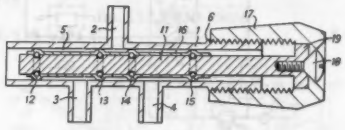
Douglas Daniel John Nightingale, St. Albans, England, assignor to Imperial Chemical Industries Limited, London, England

Filed June 6, 1975, Ser. No. 584,533

Claims priority, application United Kingdom, June 25, 1974, 28099/74

Int. Cl. F16k 11/06, 3/00

U.S. Cl. 137—625.48 6 Claims



1. A plug valve comprising a valve body having a bore and at least two radial ports communicating with said bore, and a spindle located within the bore, wherein the diameter of the spindle is less than the diameter of the bore to provide space for fluid to flow therebetween when passing from one port to another,

the spindle comprising a mandrel encircled by a plurality of O-rings located in grooves around the mandrel and covered by a plastics sleeve which provides a covering extending continuously over all of said O-rings and the areas of the mandrel therebetween, the external diameter of the O-rings being greater than that of the mandrel so that the portions of the sleeve overlying the O-rings stand proud of the portions therebetween and are biased by the O-rings against the bore to form sliding seals between the spindle and the bore, whereby the space enclosed between the spindle and the bore is divided by the seals to define at least one discrete flow passage alignable with selected ports to permit fluid flow therebetween.

3,993,100

HYDRAULIC CONTROL SYSTEM FOR CONTROLLING A PLURALITY OF UNDERWATER DEVICES

Terry W. Pollard; David P. Herd, and Jack Whiteman, all of Houston, Tex., assignors to Stewart & Stevenson Oiltools, Inc., Houston, Tex.

Filed Apr. 28, 1975, Ser. No. 572,039

Claims priority, application United Kingdom, Apr. 29, 1974, 18753/74

Int. Cl.² E21B 43/01

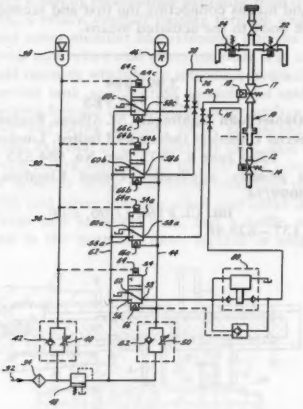
U.S. Cl. 137—628 12 Claims

2. A hydraulic control system for controlling a plurality of hydraulically actuated underwater devices comprising,

a single hydraulic control line extending underwater,

a plurality of hydraulic control valves, each having an inlet and an outlet and controlling the flow of hydraulic actuating fluid and individually connected to each of said underwater devices, each of said control valves controlled for movement to open and closed positions by first and second pistons, the ratio of the cross-sectional area of the first piston relative to the cross-sectional area of the second piston of at least one of the valves being different from the ratio of the cross-sectional area of the first piston relative to the cross-sectional area of the second piston of other of said control valves,

a reference hydraulic manifold connected to said single control line and to said second piston of each valve for holding a reference pressure on said second pistons,



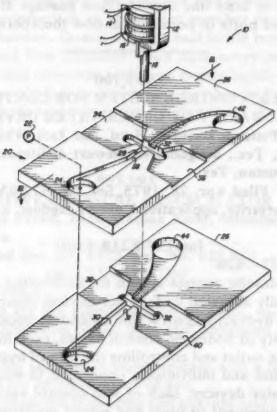
a signal hydraulic manifold connected to said single control line and to the first piston of each valve whereby said control valves and said connected underwater devices may be controlled in a desired sequence by applying predetermined pressure levels to said single hydraulic control line.

3,993,101

TRISTABLE FLUIDIC DEVICE

Thomas B. Tippetts, and Donald W. Chapin, both of Scottsdale, Ariz., assignors to The Garrett Corporation, Los Angeles, Calif.

Filed Aug. 25, 1975, Ser. No. 607,529
Int. Cl.² F15C *1/10, 3/00*
U.S. Cl. 137—831 **6 Claims**



1. A tristable fluidic device, comprising:

means forming a pair of laterally spaced nozzles and a pair of output ports generally respectively aligned with said pair of nozzles and longitudinally spaced therefrom, each of said pair of nozzles adapted to receive fluid under pressure from a source and direct an associated fluid beam in a longitudinal direction generally toward the associated output port; and

deflector means disposed between said pair of nozzles and said pair of output ports for shifting laterally therebetween, said deflector means being selectively positionable in a center position between said pairs of nozzles to allow the fluid beams of both said nozzles to discharge through the associated, aligned output ports, said deflector means being shiftable in opposite directions away from said center position to respectively interrupt flow of one and the other of said fluid beams to the associated output ports,

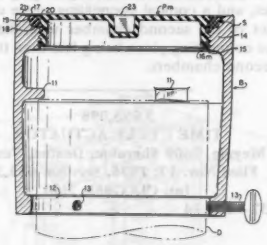
one of said pairs of nozzles and the output port aligned and associated therewith being effectively disposed in a first plane, and the other of said nozzles and the output port associated therewith being effectively disposed in another plane spaced from said one plane in a third direction generally perpendicular to said longitudinal and said lateral direction, to substantially prevent fluid interaction between said one and said other beams in all positions of said deflector means.

3,993,102

CLEANOUT FITTING COMBINATION

Lewis H. Polster, Shaker Heights, Ohio, and George J. Flegel, Michigan City, Ind., assignors to Josam Manufacturing Co., Michigan City, Ind.

Filed Nov. 5, 1974, Ser. No. 521,074
Int. Cl.² F16L *55/10*
U.S. Cl. 138—89 **14 Claims**



1. A plumbing fitting combination, of a hollow body adapted to be joined to a pipe and having a round, female-threaded, body opening, with a removable plug for closing that body opening, said body having a formation surrounding and defining the opening provided by

a circumferential inward thick lip threaded with a female taper thread, and

a circumferential seal seat on the outer side of said lip;

a compressible seal ring received by said seat; and

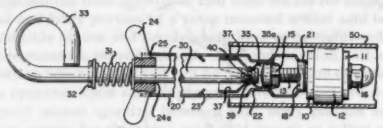
a removable shouldered plug for said opening having at its outer end a circumferential shoulder adapted to engage with and to apply body-to-plug sealing forces to the seal ring upon inward axial advance of the plug, and running from its inner end, a short length of male thread of the same pitch as the female thread for screwed plug engagement in the body opening; the male thread being diametrically proportioned, along its length relative to the female thread for a non-interfering threaded engagement enabling axial plug advance to required compression of the seal ring,

whereby with the fitting body, there may be optionally used a plug having a male taper thread corresponding to the female thread thereby to effect a thread-to-thread seal between the screwed-in plug and the body.

3,993,103
PIPE LINE EXPANSION PLUGS AND TOOLS

Victor Hammer, Berkeley Heights, N.J., assignor to Inner-Tite (A Division of Yara Engineering Corporation), Springfield, N.J.

Filed Sept. 18, 1975, Ser. No. 614,704
Int. Cl.² F16L *55/12*
U.S. Cl. 138—89 **5 Claims**

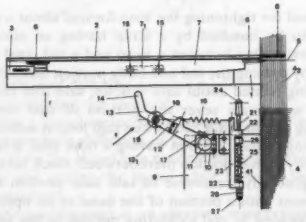


1. An expandable pipe line plug and tool comprising a flexible stopper plug normally capable of insertion axially into a pipe to be sealed and expansible into sealing engagement with said pipe line, said plug having a pair of spaced bodies movable on a threaded bolt, a deformable sleeve between said bodies being radially expansible on axial pressure by said bodies, stop means on one end of said threaded bolt bearing on one of said bodies, a head on the other end of said threaded bolt having a circular portion and a landed portion within the diameter of the circular portion, said landed portion facing the stop means and shielded from access by the circular portion, nut means threaded on said bolt bearing on the other of said bodies, a removable tool for moving said threaded bolt in said nut, said tool having an outer hollow member having a nut engaging socket at one end adapted to engage the nut of the stopper plug, and an inner member extending axially of the hollow member, gripping means on one end of the inner member within the hollow member movable from an open position adapted to pass around the circular bolt head of the stopper plug to a closed position around said circular bolt head and engaging the landed head portion, and shoe means on the outer hollow member actuating said gripping means from open position to closed position on relative axial movement of the inner member relative to the outer and handle means on each of the inner and outer members whereby they may be rotated relatively to one another to thread the nut of the stopper plug along the threaded bolt thereof to expand and contract the deformable sleeve.

3,993,104
SHUTTLE POSITIONER AND NIPPER OPENING DEVICE FOR LOOM

Jacques Palencher, Troyes, France, assignor to LeBocey Industries, Troyes, France

Filed Sept. 15, 1975, Ser. No. 613,064
Claims priority, application France, Sept. 25, 1974, 74.32340
Int. Cl.² D03D *49/48*, *47/24*
U.S. Cl. 139—155 **10 Claims**

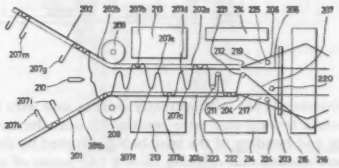


1. A woof-gauge weaving loom comprising, on the batten thereof, a shuttle provided with end nippers for the woof threads, and, on the chassis thereof being provided with devices for both correcting the position of the shuttle and for opening the nippers on the shuttle, each of said correction devices comprising an adjustable lever pivotable on the chassis of the loom and having a portion engageable with a guide element on the shuttle, and said nipper opening devices each comprising a rod coacting, by one end, with the nipper of the shuttle for its opening, said rod sliding elastically in a support fixed to the chassis and being arranged perpendicularly to the pivoting axis of the lever.

3,993,105
METHOD OF AND A MACHINE FOR MANUFACTURING NAP FABRIC STRIP CLOSURE DEVICES

Ferdinand Diesner, Murg-Hanner, Germany, assignor to Patax Trust Reg., Switzerland

Filed July 3, 1975, Ser. No. 592,903
Claims priority, application Switzerland, Oct. 29, 1974, 14504/74
Int. Cl.² D03D *39/16*
U.S. Cl. 139—291 C **5 Claims**



1. A method of manufacturing nap fabric strips for strip closure devices comprising the steps of simultaneously weaving, from respective weft and first warp threads, two fabric strips having mutually facing surfaces spaced from each other; during such weaving, weaving second warp threads alternately into said strips so that portions of said second warp threads interconnect said strips; while said second warp threads are being woven into said strips, feeding said second warp threads at a first feed rate; while the interconnecting portions are being formed, feeding said second warp threads at a second feed rate greater than said first feed rate; using rod members to guide interconnecting portions of said second warp threads along substantially S-shaped paths; stabilizing the shape of the thus guided interconnected portions; and cutting each stabilized interconnecting portion to disconnect said strips from each other and to provide each strip with a plurality of knubs which are hook-shaped.

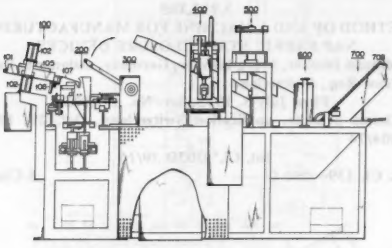
3,993,106
WIRE SPRING-MANUFACTURING APPARATUS

Masayuki Yokota, Hachioji, Japan, assignor to France Bed Co., Ltd., Tokyo, Japan

Filed Oct. 25, 1974, Ser. No. 517,908
Claims priority, application Japan, Oct. 31, 1973, 48-122339; Mar. 8, 1974, 49-26202; Aug. 27, 1974, 49-98259
Int. Cl.² B21F *3/00*, *35/00*, *45/00*
U.S. Cl. 140—71 R **12 Claims**

1. Wire spring-manufacturing apparatus comprising:
   a. a wire rotating device for clamping a straight wire of prescribed length delivered from a wire feeder substantially at its center, and intermittently rotating said wire about its longitudinal axis;
   b. a pair of wire bending devices disposed on opposite sides of said wire rotating device so as to intermittently approach each other toward the wire rotating device in timed relation to the rotation of the wire and horizontally bending both ends of the wire to form spring legs at each time of their mutual approach, said wire bending devices including:
      i. a central shaft;

ii. a disc rotating about said central shaft;
iii. a projection formed on said disc sufficiently apart from the sidewall of said central shaft to allow the wire to be placed between said projection and the sidewall; and
iv. means for rotating said disc about said central shaft horizontally to bend both ends of the wire to form spring legs;



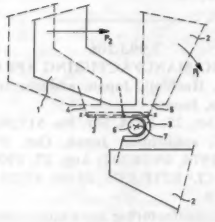
c. drive means for intermittently driving said wire bending devices toward said wire rotating device, the axial rotation and bending of the wire being actuated by the movement toward said rotating device and pause of said wire bending devices; and
d. a device for heat-treating spring legs formed at both ends of the wire.

3,993,107

METHOD OF MANUFACTURING BENT FILAMENTS AND DEVICE FOR CARRYING OUT THE SAID METHOD

Georg Zander, Stolberg, Germany, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Mar. 19, 1975, Ser. No. 559,822
Claims priority, application Germany, Mar. 22, 1973, 2413791
Int. Cl.² B21F *45/00*
U.S. Cl. 140—71.5 **6 Claims**



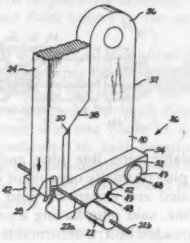
1. A method of manufacturing bent filaments for electric incandescent lamps which comprises: providing an initially straight core-free coiled filament having a first end and a back end and an initially straight axis, bending said filament by seizing the ends thereof and contemporaneously (1) bending said front end around said mandril, (2) driving said mandril in accordance with the filament bending speed; and moving the rear end of the filament in a straight line in the direction of said initially straight filament axis.

3,993,108

APPARATUS FOR FORMING WIRE-LIKE ARTICLES

Duane L. Kirschenman, and Terrell M. Shoffner, both of Winston-Salem, N.C., assignors to Western Electric Company, Inc., New York, N.Y.

Filed Dec. 3, 1975, Ser. No. 637,435
Int. Cl.² B21F *1/00*
U.S. Cl. 140—105 **12 Claims**



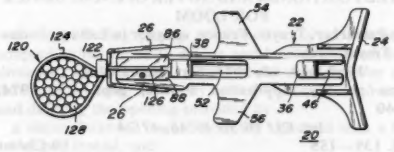
1. Apparatus for forming a wire-like article comprising:
means for supporting a wire-like article so that the article can be bent and formed thereover;
means mounted for movement adjacent to and cooperating with the supporting means for bending and forming the wire-like article;
means for moving the bending and forming means to bend and form the wire-like article; and
means for permitting movement of the supporting means away from the bending and forming means during the forming of the wire-like article to increase distance between the supporting means and the bending and forming means to provide sufficient space therebetween for the wire-like article being formed thereby.

3,993,109

STRAP TIGHTENING AND SEVERING TOOL

William A. Fortsch, Livingston, N.J., assignor to Thomas & Betts Corporation, Elizabeth, N.J.

Filed Jan. 16, 1976, Ser. No. 649,633
Int. Cl.² B21F *9/02*
U.S. Cl. 140—123.6 **4 Claims**



1. A tool for tightening the loop formed about a plurality of articles to be bundled by a strap having an elongate body portion extending between a head and a tail, said loop being formed by passing the tail and body portion through said head after being passed about said articles, said tool further being able to selectively sever the portion of said body portion extending beyond said head when said loop is sufficiently tight comprising: a base portion having a nose end, a tail end and a generally planar portion therebetween; stock means coupled to and generally transverse to said base portion tail end for engagement with a portion of the hand of an operator; guide means coupled to and extending normal to the plane of said planar portion of said base portion intermediate said nose end and tail end; slide means having a nose portion and a tail portion and a generally planar portion therebetween to overlie said base portion planar portion, said nose portion and said

tail portion respectively positioned adjacent said nose end and said tail end; guide means receivers in said planar portion of said slide means to receive therein said guide means of said base portion and guide the movement of said slide means along said planar portion of said base portion; finger grips coupled to said slide means and engageable by the fingers of an operator; and a recess in said slide means nose portion normal to the plane of said slide means for the receipt therein of the tail and body portion of said strap; strap gripping means adjacent the nose portion of said slide means for engaging the tail and body portion of a strap inserted within said recess of said slide means and causing said loop to be tightened as said slide means is moved towards a second position with said tail portion adjacent said tail end by the application of pressure by an operator upon said finger grips towards said stock; spring return means coupled between said body portion and said slide means for returning said slide means to a first position with said nose portion adjacent said nose end once the operator pressure has been removed; release means on said base portion adjacent said nose end for engaging said strap gripping means when said slide means is in said first position to release said gripping means from a strap body portion placed therein; nose means coupled to said base portion nose end and having a slot therein, at least partially aligned with the recess in said slide means and proportioned to permit the tail and body portion of a strap to pass therethrough into the recess of said slide means in a direction normal to the plane of said planar portion of the base portion; the edges of said nose means defining the slot normal to the plane of said planar portion being sharpened to permit the excess of the strap body portion beyond said head, once the loop has been tightened to a desired tension, to be severed by the rotating of said tool clockwise or counterclockwise about the longitudinal axis of said base portion causing said strap body portion to engage the sharpened edges of said slot.

3,993,110

METHOD OF DIFFUSING GAS INTO A SEALED VESSEL AND A DEVICE FOR CARRYING OUT THE METHOD

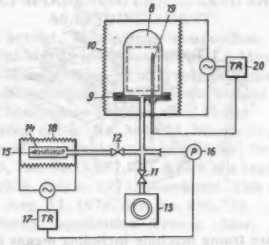
Sven Gustaf Gustafsson, Enskede, Sweden, assignor to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden

Filed Feb. 12, 1975, Ser. No. 549,155

Claims priority, application Sweden, Feb. 27, 1974, 74025644

Int. Cl.² B65B *3/04*; B67C *3/12*

U.S. Cl. 141—4 **7 Claims**



1. A method of diffusing gaseous medium into a vessel, said method comprising the steps of:

providing a vessel including a wall portion made of a material permitting diffusion of gas therethrough;

then heating the vessel to a predetermined elevated temperature and sealing the vessel while being at said elevated temperature;

evacuating said vessel at an elevated temperature; and

exposing the evacuated and sealed vessel for a predetermined period of time to an atmosphere of gas to be diffused into the vessel while maintaining said atmosphere for said predetermined period of time at an elevated temperature less than the temperature at which the vessel is sealed and at a gas pressure higher than the pressure within the evacuated sealed vessel, thereby causing diffusion of the gas into the vessel for filling the same with said gas.

3,993,111

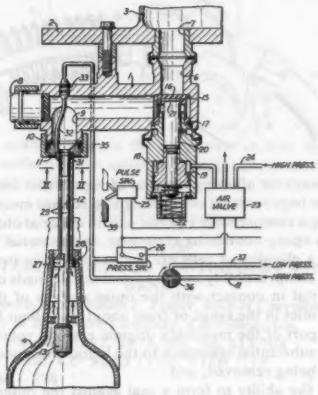
CONTAINER-FILLING MACHINE WITH LEVEL SENSING AND BLOWDOWN

Richard G. McLennand, Coraopolis, Pa., assignor to Horix Manufacturing Company, Pittsburgh, Pa.

Filed May 15, 1975, Ser. No. 577,834

Int. Cl.² B65B *3/04*

U.S. Cl. 141—90 **5 Claims**



1. In a container-filling machine, the combination with a vertical tubular nozzle provided at its lower end with an outlet for discharging a semi-liquid product into a surrounding container, of a level-sensing collar rigidly mounted on the nozzle in sealing engagement therewith and provided in its bottom with an upwardly extending recess encircling the nozzle, the collar being spaced above the nozzle outlet and having a plurality of circumferentially spaced openings extending downwardly through it into said recess, air tubes connected to the upper ends of said openings and extending upwardly therefrom along the nozzle, air-receiving means connected with the upper ends of said tubes, means for supplying high pressure air to said air-receiving means for the tubes to deliver to said collar recess to blow down out of it any of said product that has accumulated in it, and means for then supplying low pressure air to said air-receiving means for the tubes to deliver to said collar recess.

3,993,112

LIQUID-DISPENSING NOZZLE ASSEMBLY

Bernard E. Weidenaar, Hacienda Heights, Calif.; Frederick L. Voelz, Orland Park; James J. Simnick, Riverdale, both of Ill., and Peter P. Moskovich, Jr., Gary, Ind., assignors to Atlantic Richfield Company, Philadelphia, Pa.

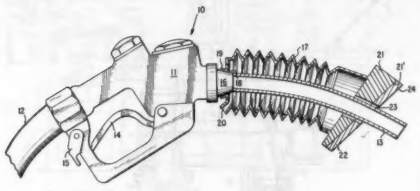
Continuation-in-part of Ser. No. 468,787, May 9, 1974, abandoned. This application Mar. 31, 1975, Ser. No. 563,876

Int. Cl.² B65B *3/04*

U.S. Cl. 141—392 **15 Claims**

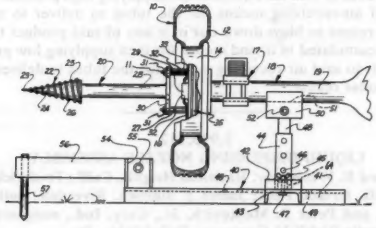
1. A liquid dispensing nozzle assembly for delivery of liquid from a liquid source to a liquid receiver having a receiver inlet, said assembly being provided with means to allow for the removal of vapor during delivery of liquid to said receiver inlet from said source, said nozzle assembly comprising:

1. a liquid dispensing nozzle having a nozzle inlet, a nozzle housing and an elongated discharge spout adapted for insertion into said receiver inlet;
2. a vapor collector surrounding, in spaced relation thereto and forming a chamber therearound, the upper portion of said spout nearest said nozzle housing, said chamber being in fluid communication with the receiver inlet when said nozzle is inserted into said liquid receiver, one end of said vapor collector being sealed to said nozzle housing, or in proximity thereto, a sealant means carried by the other end of said vapor collector and having an exposed face for forming a surface seal against the outer surface of said receiver inlet, said spout extending beyond the other end of said sealant means; and



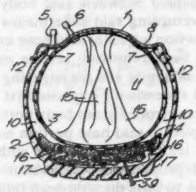
3. means for allowing removal of vapor from said chamber; the improvement comprising said sealant means comprising a compressible cellular plastic material obtained from an epoxy-containing elastomer, said material having:
   a. a plurality of cells present as part of its structure;
   b. compressibility under normal nozzle loads of the material in contact with the outer surface of the receiver inlet in the range of from about 5 to about 85% of that part of the material's original preload volume;
   c. substantial resistance to the liquid dispensed and vapor being removed, and
   d. the ability to form a seal against the outer surface of said receiver inlet and reduce the amount of vapor escaping to the atmosphere during liquid dispensing when said spout is inserted into and said exposed face contacts the outer surface of said receiver inlet.

3,993,113
LOG SPLITTING APPARATUS
Russell H. Thackery, 2376 Brentwood Road, Columbus, Ohio 43209
Filed May 19, 1975, Ser. No. 578,539
Int. Cl.² B27L 7/00; F16H 37/00; B60J 25/08
U.S. Cl. 144—194 **4 Claims**



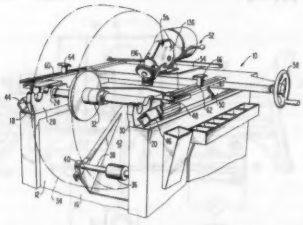
1. A log splitting apparatus comprising, in combination, a driven vehicle hub provided with a plurality of lug bolts spaced radially outwardly from the axis of rotation of the hub; supporting means for maintaining said driven hub in a position raised off the ground; log splitter body means including a base portion and a generally cone-shaped end portion including a sharpened tip and an outer cone surface provided with a spiral auger portion that increases in diameter inwardly from said tip; and a plurality of lug bolt extenders, each of whch includes an inner end attached to a respective one of said lug bolts and an outer end attached to said base portion by a threaded fastener means for removably mounting said log splitter body means to said vehicle hub.

3,993,114
PNEUMATIC TIRE
Mitja Victor Hinderks, 15a Adamson Road, Hampstead, London, N.W. 3, England
Filed Mar. 13, 1974, Ser. No. 450,672
Int. Cl.² B60C 5/06
U.S. Cl. 152—340 **13 Claims**



1. A pneumatic tyre comprising a carcass, a tube accommodated in the carcass and spaced therefrom to form inner and outer air chambers, a loose, circumferentially extending, puncture-resistant band positioned substantially in the mid-circumferential plane of the tyre between the underside of the tyre tread and the tube, said band including irregular passages extending therethrough, and wherein said passages are provided with means which are operative for producing an audible signal when air passes therethrough.

3,993,115
TIRE TRUING MACHINE
Aubrey E. Greene, and Thomas F. Layfield, both of Rte. No. 2, Ellaville, Ga.
Filed Oct. 17, 1975, Ser. No. 623,307
Int. Cl.² B29H 21/08; B23B 3/22, 37/00
U.S. Cl. 157—13 **6 Claims**



1. In a tire truing machine including means for supporting and rotating a tire on its axis,
   platform means and means for imparting sliding movement to said platform along a preselected path according to the desired contour to be cut on the periphery of said tire, and
   a cutter head assembly mounted on said platform, the improvement in the cutter head comprising:
   motor means,
   an output shaft driven by said motor means,
   a bearing housing for supporting said output shaft,
   a rotatable cutting tool means for mounting said cutting tool on said output shaft,
   means for adjusting the position of said cutting tool relative to said bearing housing comprising sleeve means thread-

ably engaging said output shaft and coextensive therewith, the position of said sleeve relative to said shaft and cooperating with mounting means positions said cutting tool relative to the bearing housing, and means for sharpening said cutting tool.

3,993,116

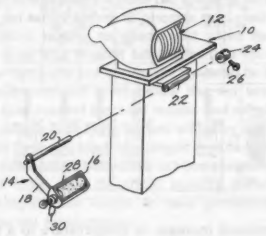
RASP SHARPENER

Donaldee Brewer, Muscatine, Iowa, assignor to Bandag, Incorporated, Muscatine, Iowa

Filed Mar. 27, 1975, Ser. No. 562,687

Int. Cl.² B29H *21/00*; B24B *3/60*

U.S. Cl. 157—13 **9 Claims**



1. In a tire buffing machine including a frame and a rotatably driven rasp having cutting edges, a sharpening device comprising a cylindrical abrasive sharpening stone mounted for rotation about its axis on one end of an arm, means mounting the other end of the arm to the machine frame for swinging movement toward and away from the rasp so that the periphery of the stone may be brought into engagement with the moving cutting edges of the rasp in a position to be rotated by said edges while sharpening the same, and a spring adjustable brake mechanism capable of being adjusted by an operator for applying controlled variable resistance to rotation of the stone such that the stone rotates more slowly than the rasp.

3,993,117

METHOD FOR INCREASING THE MECHANICAL RESISTANCE OF FOUNDRY MOULDS OR CORES MADE FROM A SELF-HARDENING LIQUID SAND AND A RESIN AS BINDING AGENT

Roland F. Chevriot, Sainte-Genevieve-des-Bois; Marcel P. Gonon, Saint-Martin-le-Vinoux; Gilles Le Maux, Woippy, and Daniel Mangin, Foug, all of France, assignors to Centre Technique des Industries de la Fonderie; Wendel Sidelor and Industries Chimiques de Voreppe, all of France

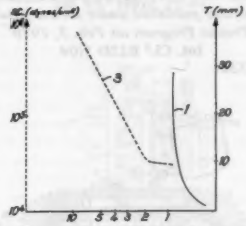
Continuation of Ser. No. 344,621, March 26, 1973, abandoned, and a continuation-in-part of Ser. No. 333,868, Feb. 20, 1973, Pat. No. 3,857,712, which is a continuation of Ser. No. 160,026, July 6, 1971, abandoned. This application Aug. 12, 1974, Ser. No. 496,770

Claims priority, application France, Mar. 27, 1972, 72.10727

Int. Cl.² C08L *61/20*; B22C *1/22*

U.S. Cl. 164—43 **4 Claims**

1. A fluidized self hardening mixture for making foundry molds and cores of increased mechanical resistance comprising sand, a liquid, a mineral or organic acid as a setting agent, 0.5–5% by weight with respect to the weight of the sand of a binder which is (a) a urea-formaldehyde resin, wherein the F/U ratio is comprised between 1 and 4, (b) a urea-formaldehyde-furfuryl alcohol resin, (c) a mixture of urea-formaldehyde resin and furfuryl alcohol, the proportion of furfuryl alcohol in the mixture being up to 55%, (d) a mixture of urea-formaldehyde resin and urea-formaldehyde-furfuryl alcohol resin and a surface-active agent capable of producing a foam which begins to subside before the sand begins to set, wherein the surface-active agent is n-dodecyl benzene sulfonic acid or a mixture of n-dodecyl benzene sulfonic acid and



p-toluene sulfonic acid; in the proportion of 0.01 to 2% by weight of surface-active agent with respect to the total weight of the liquid sand.

3,993,118

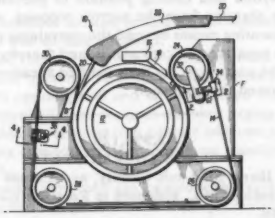
ADJUSTABLE GUIDE FOR CONTINUOUS CASTING BAND

John B. Moore, and William F. Prater, both of Carrollton, Ga., assignors to Southwire Company, Carrollton, Ga.

Filed Sept. 12, 1975, Ser. No. 612,704

Int. Cl.² B22D *11/06*; F16H *7/18*

U.S. Cl. 164—278 **7 Claims**

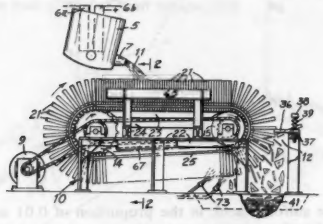


1. A wheel-band type continuous casting machine comprising a rotatably mounted casting wheel having a peripheral groove closed along a portion of its length by an endless flexible band having two faces and two edges, the portion of said groove closed by said band defining a casting mold, a plurality of guide wheels mounted adjacent said casting wheel for guiding said band therearound, said guide wheels including a mold inlet presser wheel rotatably mounted on a pivot arm for movement toward and away from the periphery of said casting wheel, first means independent of said presser wheel carried by said pivot arm and engageable with one edge of said band for restraining movement of said band in one direction parallel to the axis of rotation of said casting wheel, and second means not carried by said pivot arm engageable with the other edge of said band for restraining movement of said band in the other direction parallel to the axis of rotation of said casting wheel.

3,993,119
PROGRESSIVELY OR CONTINUOUSLY CYCLED MOLD FOR FORMING AND DISCHARGING A FINE CRYSTALLINE MATERIAL

John J. Scott, Niagara Falls, Canada, assignor to Norton Company, Worcester, Mass.

Filed Nov. 8, 1974, Ser. No. 522,038
Disclosure was also published under second Trial Voluntary Protest Program on Feb. 3, 1976
Int. Cl.² B22D *5/04*
U.S. Cl. 164—330 **10 Claims**



1. In an abrasive slab casting device wherein a molten abrasive oxide material is cast between a plurality of generally vertically arranged chilling plates having opposing pairs of surfaces shaped to form a narrow abrasive receiving recess between each pair of plates, said plates being supported so they are normally free to move towards and away from each other, the improvement which comprises

plate driving means in front of a casting position moveable at a predetermined velocity and operative on a group of plates, while generally vertically arranged, to push them toward, through and beyond the casting position,

plate restraining means beyond said casting position having a surface which is moving at less than said predetermined velocity and which acts to restrain said group of plates so that adjacent pairs of plates are pressed together through and beyond said casting position to prevent leakage of molten abrasive from the narrow recesses, and

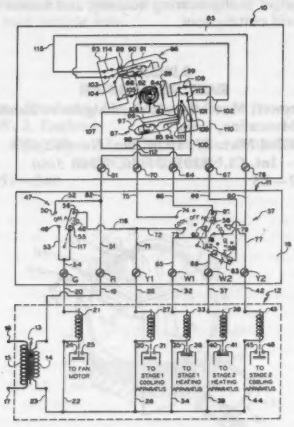
plate separating means beyond the restraining means operative to separate adjacent plates, and thereby to discharge from the narrow recess the solidified abrasive oxide material formed therebetween.

3,993,120
SPACE THERMOSTAT

Willard J. Iberg, St. Louis County, and Claude H. Keathley, Arnold, both of Mo., assignors to Emerson Electric Co., St. Louis, Mo.

Filed Nov. 18, 1974, Ser. No. 525,000
Int. Cl.² F25B *29/00*; **G05D** *23/00*
U.S. Cl. 165—26 **11 Claims**

1. In a space thermostat for controlling a two-stage heating apparatus and a two-stage cooling apparatus, a single thermally responsive sensing element, electrical switch means comprising two double-throw switches operatively connected to said sensing element, electrical connection means for selectively connecting said switch means to said heating apparatus and to said cooling apparatus, one of said switches effecting the energizing of said one of said two-stage heating apparatus when moved in one direction in response to a decrease in temperature sensed by said sensing element and effecting the energizing of stage two of said two-stage cooling apparatus when moved in an opposite direction in response to an increase in temperature, and the other of said switches effecting the energizing of stage two of said two-stage heating apparatus when moved further in said one direction in response to an additional predetermined decrease in temperature to a temperature below the energizing temperature of said stage one of said two-stage heating apparatus and effecting the energizing of stage one of said two-stage cooling apparatus when moved a lesser amount in said opposite direction in response

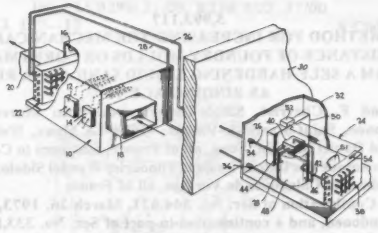


to a predetermined increase in temperature to a temperature below the energizing temperature of said stage two of said two-stage cooling apparatus.

3,993,121
HEAT PUMP CONVERSION SYSTEM FOR ELECTRIC FURNACE

Glenn D. Medlin, P.O. Box 608, Mount Pleasant, N.C. 28124, and Glenn D. Medlin, Jr., P.O. Box 1012, Concord, N.C. 28025

Filed Dec. 29, 1975, Ser. No. 644,582
Int. Cl.² F25B *29/00*
U.S. Cl. 165—29 **7 Claims**



1. A heat pump conversion system comprising

furnace means located within a building to be heated including a heat exchanging chamber, electrical heating means disposed in said chamber and first coil heat exchanger means disposed in said chamber and having first and second ports;

an outside heat exchanger unit including refrigerant compressor means having an inlet and an outlet, second coil heat exchanger means having first and second ports, pipe means providing refrigerant communication between said first port of said first coil heat exchanger means and said second port of said second coil heat exchanger means, and pipe and valve means selectively providing refrigerant communication between said inlet and said outlet of said compressor means, said second port of said first coil heat exchanger means and said first port of said second coil heat exchanger means, said valve means having a cooling state establishing communication between said

outlet of said compressor means and said first port of said second coil heat exchanger means and between said inlet of said compressor means and said second port of said first coil heat exchanger means and a heating state establishing communication between said outlet of said compressor means and said second port of said first coil heat exchanger means and between said inlet of said compressor means and said first port of said second coil heat exchanger means;

electrically operated control means for controlling operation of said valve means;

control element means for controlling operation of said electrical heating means; and

thermostat means disposed in a space to be heated within the building including first heating switch means operable when the temperature within the space to be heated drops below a set temperature to operate said electrically operated control means to place said valve means in said heating state and second heating switch means operable when the temperature within the space to be heated drops to a predetermined level below the set temperature to operate said control element means and supply electricity to said electrical heating means whereby heat is obtained from said first coil heat exchanger means when the space temperature drops below the set temperature and heat is obtained from said electrical heating means when the space temperature drops to said predetermined level below the set temperature.

3,993,122

STEPS, STAIRS AND THE LIKE

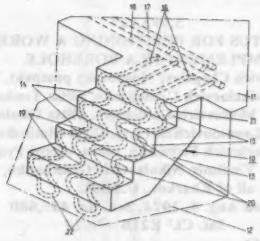
Sven Gunnar Svenstam, Upplands Vasby, Sweden, assignor to Granges Essem Aktiebolag, Vasteras, Sweden

Continuation-in-part of Ser. Nos. 284,456, Aug. 28, 1972, Pat. No. 3,881,235, and Ser. No. 462,538, April 19, 1974, abandoned. This application Sept. 24, 1975, Ser. No. 616,397

Claims priority, application Sweden, Aug. 27, 1971, 10908/71

Int. Cl.² F24H *3/00*; E04F *11/14*

U.S. Cl. 165—45 **6 Claims**



1. A flight of steps, stairs and the like having pipe means arranged to conduct heating medium to maintain the steps free from ice and snow, said pipe means being permanently preshaped to present interconnected substantially arcuate portions and extending substantially in the longitudinal direction of the flight of steps in a tortuous path such as to present substantially arcuate interconnected looped portions located within the confines of the flight of steps and curving alternately towards either side of the flight of steps, said pipe means being arranged beneath the treads and risers of the steps in planes extending substantially parallel with said treads and risers, said pipe means extending substantially perpendicular to the longitudinal direction of said flight of steps at the junctions between treads and risers.

3,993,123

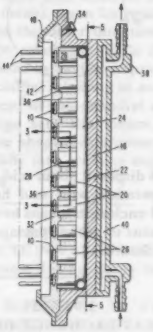
GAS ENCAPSULATED COOLING MODULE

Richard C. Chu; Omkarnath R. Gupta; Un-Pah Hwang, and Robert E. Simons, all of Poughkeepsie, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 28, 1975, Ser. No. 626,399

Int. Cl.² H01L *23/44*

U.S. Cl. 165—80 **10 Claims**



1. A gas encapsulated cooling module for heat generating elements comprising:

a substrate;

one or more heat generating components mounted on said substrate;

a heat conductive cap sealed to said substrate enclosing said one or more heat generating components;

the wall of said cap opposite the substrate containing elongated openings therein extending toward said heat generating components and on the same centers with respect thereto,

a resilient member located in said cap in communion with the inner end of said openings;

one or more thermal conductive elements each located in one of said openings forming a small peripheral gap between the opening wall and said associated thermal conductive element, said resilient member urging said thermal conductive element into contact with one of said heat generating components forming a heat transfer interface therewith;

a thermal conductive inert gas located within said cap filling the peripheral gaps and said heat generating element conductive element interface;

heat removal means associate with said cap for externally removing the heat generated by said heat generating means from said cap.

3,993,124

METHOD AND APPARATUS FOR FUSER ASSEMBLY COOLING IN AN ELECTROSTATOGRAPHIC MACHINE

Karl Mueller, Fairport, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Dec. 30, 1971, Ser. No. 214,305

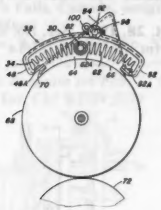
Int. Cl.² F28D *11/02*

U.S. Cl. 165—89 **6 Claims**

1. In an electrostatographic machine for producing copies, the combination of:

a fuser for fusing the copies, said fuser including a pair of rollers, means supporting said roller pair for rotation with the peripheries of said roller pair in contact whereby said roller pair form a nip between which the copies pass, and means to heat at least one roller of said roller pair;

heat transfer means in heat exchange relation with said fuser; and



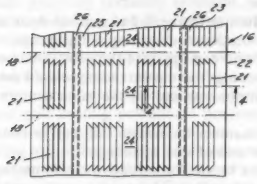
enclosure means disposed about said heat transfer means to form in cooperation with said heat transfer means a chamber, said enclosure means being provided with inlet and outlet means to permit passage of heat transfer fluid through said chamber.

3,993,125

HEAT EXCHANGE DEVICE

Eugene E. Rhodes, Belleville, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Nov. 28, 1975, Ser. No. 636,182
Int. Cl.² F28F 1/22
U.S. Cl. 165—153 **7 Claims**



1. A heat exchange device having a vessel and heat transfer core means including at least two tubular conduits in fluid communication with the vessel,

the tubular conduits being spaced apart to form an air passageway therebetween,

and a spacer member between and in heat exchange relationship with said tubular conduits,

the spacer member comprising a unitary strip of metal folded back and forth to form a plurality of fin elements each having an essentially planar base member between the fold edges,

each spacer member having its longitudinal axis in parallel relationship to the longitudinal axes of the tubular conduits with the fin elements dividing the air passageway into a plurality of smaller passageways,

each planar base member having a plurality of louvers therein,

the louvers being integral with and extending laterally of the planar base members and arranged in groups having a support portion therebetween,

wherein the improvement comprises the unitary strip being of very thin metal with a hem flange extending substantially the length of the strip through the support portions between groups of louvers,

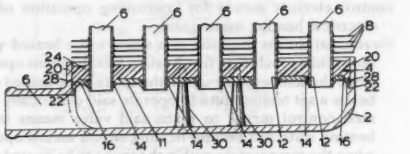
the hem flange forming a support column in each planar base member adapted to resist buckling of the latter in a direction transversely thereof.

3,993,126

HEAT EXCHANGER

Charles Taylor, Potters Bar, England, assignor to Delanair Limited, Barking Essex, England

Filed July 25, 1974, Ser. No. 491,648
Claims priority, application United Kingdom, July 27, 1973, 35877/73
Int. Cl.² F28F 9/04
U.S. Cl. 165—173 **11 Claims**



1. A heat exchanger comprising

a header tank that defines a fluid chamber, said header tank having a plastic membrane wall that forms a portion of said tank's wall,

an annular wall extending outwardly from said header tank's wall and surrounding at least a portion of said membrane wall, said membrane and annular walls thereby defining a casting mold on the exterior surface of said header tank,

a plurality of tubes connected in fluid transfer relation with that portion of said header tank's membrane wall surrounded by said outwardly extending annular wall,

structure fixing each of said tubes and said membrane wall in mechanical resilient grip relation one to the other, said structure providing a fluid tight seal therebetween, and

a resin compound cast onto the exterior surface of said header tank in that area defined by said annular wall to form a resin layer of substantial thickness, the resin compound being such as to provide a bond of strength with said tubes and with said membrane wall, said membrane wall and said resin layer thereby combining to form a rigid collector plate for said heat exchanger.

3,993,127

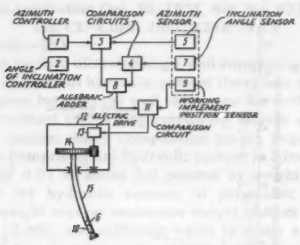
APPARATUS FOR POSITIONING A WORKING IMPLEMENT IN A BOREHOLE

Viktor Gavrilovich Chepelev, Moskovsky prospekt, 232-A, kv. 10; Nikolai Nikolaevich Grinchenko, ulitsa Tonkopia, 24-A, kv. 26; Jury Moiseevich Goldshtein, ulitsa Olminskogo, 17, kv. 2; David Leonidovich Shvarts, ulitsa Olminskogo, 10, kv. 1; Nikolai Pavlovich Fetisenko, ulitsa Vtoroi Pyatiletki, 61, kv. 20, and Vladimir Nikolaevich Grinchenko, ulitsa Kedrovaya, 20, all of Kharkov, U.S.S.R.

Filed Aug. 8, 1974, Ser. No. 495,680
Int. Cl.² E21B 47/024
U.S. Cl. 166—66 **4 Claims**

1. An apparatus for positioning a working implement in a borehole comprising: an actuator for changing the position of a working implement; an electronic deep compass having deep-hole sensors, one sensor sensing the angle of inclination of the borehole axis with respect to the vertical, one sensor sensing the azimuth of the borehole, and one sensor sensing the angle of the position of the working implement with reference to the vertical plane tangential to the borehole axis at the measurement point; a surface means for controlling the position of said working implement connected to said sensors and generating a signal in accordance with deviations of output signals of said sensors from preset values, said means comprising an azimuth controller, an angle of inclination controller and three comparison circuits of which two circuits are connected in such a manner that a first comparison circuit is connected to said azimuth sensor and a controller for the

borehole azimuth, and a second comparison circuit is connected to said inclination sensor and a controller for the borehole inclination, one of said first and second comparison circuits generating a sine signal and the other a cosine signal, the amplitude of each signal being proportional to the difference between the signals of the sensor and controller, respectively, and an algebraic adder which is connected to said first



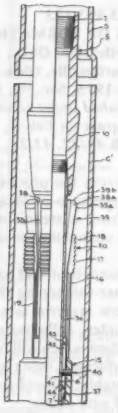
and second comparison circuits, said algebraic adder together with said sensor sensing the angle of positioning of the working implement being connected to a third of said comparison circuits which has the output thereof connected to said actuator for controlling the operation thereof, whereby the positioning of the working implement is effected until the signal at the output of said third comparison circuit becomes nil.

3,993,128

WELL TOOL FOR SETTING AND SUPPORTING LINERS

Britt O. Braddick, Houston, Tex., assignor to Texas Iron Works, Inc., Houston, Tex.

Filed Feb. 18, 1976, Ser. No. 658,914
Int. Cl.² E21B *23/00*
U.S. Cl. 166—216 **6 Claims**



1. An arrangement for setting and supporting a liner in a well bore casing comprising:

a. a tubular mandrel;

b. a cone shaped enlargement on said mandrel;

c. outer housing means slidable on said mandrel;

d. slip means on said outer housing means;

e. segmented cone means slidably supported on said mandrel between said mandrel and said outer housing means;

f. cooperating latch means on said mandrel and outer housing means for releasably securing them together;

g. said latch means including:

1. a J-shaped slot in said housing means;

2. lug means on said mandrel and engaged in said slot; and

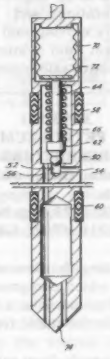
3. bow spring means on said outer housing means engageable with the well bore casing whereby as the mandrel and outer housing means move through the well bore casing in one direction said lug means is positioned in said slot to restrain relative longitudinal and rotational movement between said mandrel and outer housing, and said latch means, upon longitudinal movement of said mandrel in the other direction in the well bore casing and then rotating it while said outer housing means is restrained by said bow spring means engaging the well bore casing, releasing to accommodate longitudinal movement of said mandrel said outer housing means to engage said slip means, segmented cone means and cone shaped enlargement for urging said slip means radially into gripping engagement with the well bore casing.

3,993,129

FLUID INJECTION VALVE FOR WELLS

Fred E. Watkins, Houston, Tex., assignor to Camco, Incorporated, Houston, Tex.

Filed Sept. 26, 1975, Ser. No. 616,963
Int. Cl.² E21B *43/12*
U.S. Cl. 166—319 **5 Claims**



1. In a fluid injection valve for use in a well tubing for controlling the flow of fluid between the outside and the inside of the tubing through an opening in the tubing in which the valve includes a port, an inlet and an outlet adapted to be placed in communication with said opening and a spring-loaded relief valve yieldably closing said port against the flow of fluid from the inlet to the outlet, the improvement comprising,

a closed flexible pressurized chamber carried by the valve and having first and second ends, the first end being movably positioned adjacent to but unconnected to the valve element and the movement of the second end being limited by the valve, and

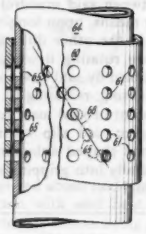
a passageway in the valve communicating between the exterior of the chamber and the outlet of the valve whereby when the valve is positioned in the tubing the exterior of the chamber will be exposed to the outlet pressure so that if the outlet pressure is below a predetermined amount the chamber will expand and urge the valve element towards the closed position, but if the outlet pressure is above a predetermined amount the chamber will contract without actuating the valve element.

3,993,130

METHOD AND APPARATUS FOR CONTROLLING THE INJECTION PROFILE OF A BOREHOLE

John C. Papp, Natural Dam, Ark., assignor to Texaco Inc., New York, N.Y.

Filed May 14, 1975, Ser. No. 577,363
Int. Cl.² E21B *43/12, 43/16*
U.S. Cl. 166—330 **8 Claims**



1. Apparatus for controlling the injection profile of a borehole, comprising in combination

a perforated tube adapted for introduction into said borehole opposite a formation that is to receive an injection fluid,

a coaxial sleeve cooperating with said tube and having perforations for variable alignment and misalignment with said tube perforations, and

means for dynamically moving said sleeve relative to said tube as said injection fluid is introduced into said borehole in order to control said injection profile.

3,993,131

TRACING FLOW OF PETROLEUM IN UNDERGROUND RESERVOIRS

E. Frederic Riedel, Tulsa, Okla., assignor to Cities Service Company, Tulsa, Okla.

Filed Nov. 3, 1975, Ser. No. 628,014
Int. Cl.² E21B *47/10*; G01N *33/28*
U.S. Cl. 166—252 **10 Claims**

1. A method for tracing the flow of fluid contained in an underground reservoir which comprises:

a. injecting into said reservoir at a first point a stable free radical and wherein the stable free radical is injected as a tracer,

b. removing a fluid sample from said reservoir at a second point following injection of said stable free radical, and

c. analyzing said sample by electron spin resonance (ESR) spectroscopy for detecting presence of a stable free radical therein.

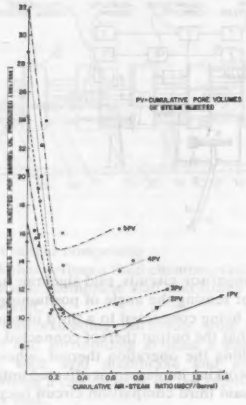
3,993,132

THERMAL RECOVERY OF HYDROCARBONS FROM TAR SANDS

Phillip J. Cram, Calgary, and David A. Redford, Fort Saskatchewan, both of Canada, assignors to Texaco Exploration Canada Ltd., Canada

Filed June 18, 1975, Ser. No. 588,124
Int. Cl.² E21B *43/24*
U.S. Cl. 166—261 **10 Claims**

1. In a method for the recovery of viscous hydrocarbons from a subterranean hydrocarbon-bearing formation, traversed by at least one injection well and at least one production well, and having fluid communication therebetween, wherein a mixture of an oxygen-containing gas and steam is injected via said injection well and hydrocarbons are produced via said production well, said mixture being injected at a temperature corresponding to the saturation temperature for saturated steam at the pressure of said formation whereby a low temperature oxidation is established in said formation, the improvement comprising decreasing the relative concentration of oxygen-containing gas in said mixture during the injection of said mixture.



3,993,133

SELECTIVE PLUGGING OF FORMATIONS WITH FOAM

Richard L. Clampitt, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Apr. 18, 1975, Ser. No. 569,519
Disclosure was also published under second Trial Voluntary Protest Program on Feb. 3, 1976
Int. Cl.² E21B *43/22, 43/24, 33/138*
U.S. Cl. 166—272 **7 Claims**

1. A process for improving the production of oil from an oilbearing formation by pressure of steam therein which is channeling undesirably from a steam injection well into a production well owing to channeling in said formation which comprises:

a. injecting into said channels of said formation an aqueous fluid containing a water-thickening amount of at least one crosslinkable polymeric material selected from water-dispersible polyacrylamides, cellulose ethers, and polysaccharides and a surfactant which will foam when contacted with steam, said surfactant being present in sufficient quantities to form a stable, self-collapsing foam when said solution is contacted with steam,

b. injecting steam downwardly through the injection well and outwardly through the formation into contact with said aqueous solution in said channels thereby causing said polymeric material to be broken down by heat which then allows the steam to form a relatively stable foam having steam as the gas phase in said channels and thereby plug same and thus producing a selective blocking which forces the remaining steam to produce oil from less depleted portions of the formation, and

c. continuing to inject steam through the formation to produce oil from the less depleted portions of the formation.

3,993,134

WELL CEMENTING METHOD USING CEMENTING COMPOSITION HAVING IMPROVED FLOW PROPERTIES

Sally L. Adams, Pittsburgh; Michael M. Cook, McKees Rocks, and Fred David Martin, McMurray, all of Pa., assignors to Calgon Corporation, Pittsburgh, Pa.

Division of Ser. No. 465,938, May 1, 1974, Pat. No. 3,943,083.
This application Oct. 16, 1975, Ser. No. 623,206
Int. Cl.² C08K *3/00;* E21B *33/14*
U.S. Cl. 166—293 8 Claims

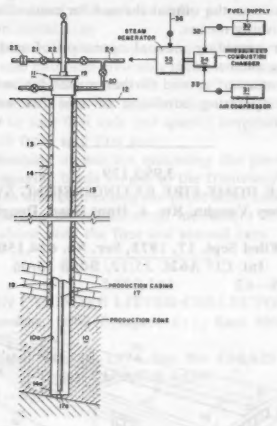
1. In the method of cementing a well comprising the step of pumping an aqueous hydraulic cement slurry into place in the annular space between the well casing and the well bore-hole, the improvement comprising employing therein an aqueous hydraulic cement slurry composition having improved flow properties comprising dry hydraulic cement in admixture with from about 0.01 to about 5.0 percent by weight, based on weight of dry hydraulic cement, of polymaleic anhydride having a weight average molecular weight of from about 200 to about 10,000; and sufficient water to make a pumpable aqueous slurry which is capable of setting to form a monolithic solid.

3,993,135

THERMAL PROCESS FOR RECOVERING VISCOUS PETROLEUM

John S. Sperry; Richard W. Krajicek, and Dudley P. South, Jr., all of Houston, Tex., assignors to Carmel Energy, Inc.

Filed July 14, 1975, Ser. No. 595,340
Int. Cl.² E21B *43/24*
U.S. Cl. 166—303 5 Claims



1. A method for injecting a heated fluid containing steam into a heavy viscous petroleum-bearing subterranean formation, having low relative permeabilities to water and oil injection, at a rate sufficiently high to impart sufficient heat to the petroleum-bearing formation to permit the petroleum to be recovered at an improved rate, said method comprising:

injecting a heated fluid comprising a mixture of steam and hot combustion gas into a well penetrating the subterranean formation at a pressure above the formation pressure and below the formation fracture gradient pressure;

simultaneously venting a portion of the heated steam-combustion gas mixture from the well at the surface at a rate and pressure to maintain a gas velocity in the well sufficiently high to lift any condensed liquids forming and collecting in the well towards the surface while maintaining substantially full injection pressure on the formation, whereby the well is kept essentially free of condensed liquids;

continuing the well injection and simultaneous surface venting steps until the well, adjacent strata and a portion of the formation adjacent the well are heated sufficiently to substantially prevent condensation of liquids within the well and adjacent formation at a rate greater than that which the formation can accept at such injection pressure due to the formation low relative premeabilities to water and oil; and

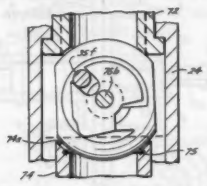
discontinuing the venting from the well and directly injecting the heated gas mixture into the formation under said injection pressure until sufficient heat has been imparted to the formation and petroleum to permit the petroleum to be recovered at an improved recovery rate.

3,993,136

APPARATUS FOR OPERATING A CLOSURE ELEMENT OF A SUBSURFACE SAFETY VALVE AND METHOD OF USING SAME

James D. Mott, Houston, Tex., assignor to Hydril Company

Filed Aug. 25, 1975, Ser. No. 607,696
Int. Cl.² E21B *43/12*
U.S. Cl. 166—314 37 Claims



1. A method of operating open a closed subsurface safety valve having a shiftable flow closure element disposed within a valve housing and engageable with a first and second seat carried by the valve housing for controlling flow of well fluids through a well tubing at a subsurface location in a well, including the steps of:

spacing a first seat from engagement with the flow closure element;

moving the flow closure element sufficiently to effect partially disengagement of the second seat to enable flow of well fluids between the second seat and flow closure element;

equalizing the well fluid pressure about the flow closure element sufficiently by flowing well fluids about the closure element between the spaced seats to minimize any differential in well fluid pressure across the flow closure element; and

shifting the flow closure element about a substantially fixed axis relative to the valve housing to enable flow of well fluids through the safety valve and well tubing.

26. A subsurface safety valve apparatus for controlling flow of well fluids through a well tubing at a subsurface location in a well, including:

a valve housing adapted to be mounted with the well tubing, said valve housing having a passageway formed therethrough for enabling flow of well fluids through said valve housing;

a flow closure element mounted with said valve housing disposed in said passageway for movement to and from an open position for enabling flow of well fluids through said passageway and a closed position for blocking flow of well fluids; through said passageway;

seat means adjacent said flow closure element for sealing with said flow closure element to block passage of well fluids therebetween when in sealing engagement with said flow closure element and for enabling passage of well

fluids therebetween when said flow closure element and said seat means are out of sealing engagement therewiith; and

operator means movably disposed in said passageway and operably connected with said flow closure element for effecting operation of said flow closure element to and from the open and closed position; said operator means partially spacing said seat means and said flow closure element to enable equalization of well fluid pressure about said flow closure element when moving said flow closure element from the closed position to the open position wherein any differential in well fluid pressure across the flow closure element is eliminated.

3,993,137

METHOD AND DEVICE FOR EXTINGUISHING FIRES IN OIL WELLS

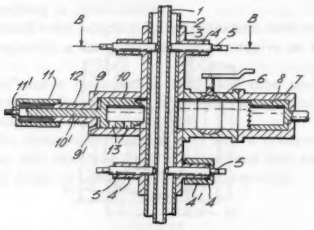
Uriel Hefetz, P.O. Box 6037, Jerusalem, Israel

Filed May 27, 1975, Ser. No. 581,147

Claims priority, application Israel, May 31, 1974, 44935

Int. Cl.² A62C *1/22*

U.S. Cl. 169—46 **15 Claims**



1. A method of extinguishing fires in oil wells having an inner pipe and and outer pipe separated by an annular space comprising the steps of:

a. providing a shell member having at least one housing formed thereon at a first level, and drill guide means and a plug housing formed thereon at a second level said plug housing having a plug member mounted therein, said drill guide means and said plug housing being diametrically oppositely positioned;

b. attaching said shell member to the outer pipe;

c. inserting at least one positioning pin member through said housing through said outer pipe and into abutment with said inner pipe at said first level to immobilize said inner pipe relative to said outer pipe;

d. positioning a drill in said drill guide means and drilling through said inner and outer pipes from said drill guide means and into said plug housing;

e. removing said drill from said inner and outer pipes; and

f. urging said plug member through said inner and outer pipes to close said pipes.

3,993,138

FIRE PREVENTION SYSTEM

Ralph B. Stevens, Santa Clara, and Walter S. Oda, San Jose, both of Calif., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Apr. 24, 1975, Ser. No. 571,180

Int. Cl.² A62C *37/22*

U.S. Cl. 169—61 **15 Claims**

1. A fire protection system comprising;

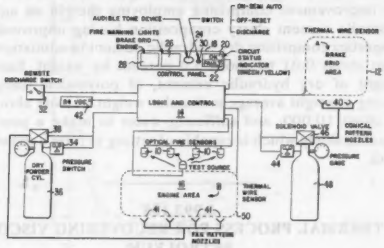
at least one fire sensing means;

means, including testing pulse means, for continually monitoring said fire sensing means to determine whether said fire sensing means is in proper operating condition;

first and second system operational status indicating means for indicating, respectively, that said fire sensing means is operating properly and said fire sensing means is operationally faulty;

means connected to said fire sensing means for indicating that a fire is being sensed by said fire sensing means;

means connected to said monitoring means and to said system operational status indicating means, and responsive to said monitored operating condition of said fire sensing means and operation of said testing pulse means for enabling selective activation of said first and second operational status indicating means and concurrently



therewith inhibiting by operation of said testing pulse means said operation of said fire sensing indicating means;

fire extinguishing means;

further means connected to said fire sensing means and responsive to the output thereof for controlling said fire extinguishing means;

means for providing manual operation of said fire extinguishing means; and

means connected to said further means for indicating the proper operating condition of said fire extinguishing means.

3,993,139

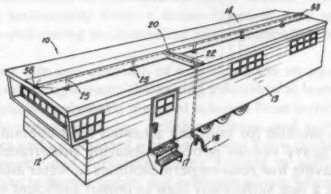
MOBILE HOME FIRE EXTINGUISHING SYSTEM

Eugene Sidney Vaughn, Rte. 4, Hunt Road, Douglasville, Ga. 30134

Filed Sept. 17, 1975, Ser. No. 614,150

Int. Cl.² A62C *35/12*; B05B *15/06*

U.S. Cl. 169—62 **7 Claims**

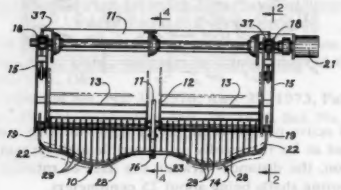


1. In a mobile home having a roof, side walls and a floor enclosing living spaces to which water may be supplied through a water line, the improvement comprising a fire extinguishing system including a trunk line mounted to the roof in fluid communication with the water line, a plurality of branch lines coupled with said trunk line and extending down through at least one opening in the roof into the living spaces, means for inhibiting water exterior said branch and trunk lines from passing through the roof opening, and a plurality of heat responsive sprinkler heads mounted to said plurality of branch lines within the living spaces.

3,993,140
SUBSURFACE ROOT CROP HARVESTING BLADE ASSEMBLY

Lynn F. Johnson, American Falls, Idaho, assignor to Idaho Research Foundation, Inc., Moscow, Idaho

Filed May 27, 1975, Ser. No. 580,877
Int. Cl.² A01D *17/00*
U.S. Cl. 171—17 7 Claims



1. An improved subsurface harvesting blade assembly for engaging, loosening and directing a subsurface root crop up and rearwardly from below the ground surface while being moved in a forward path along the ground, comprising:

a framework adapted to be mounted to a root crop harvesting implement;

a pair of upright pivot arms spaced transversely in relation to said path and mounted to the framework and depending therefrom for pivotal movement about a first horizontal axis;

earth engaging blade means pivotably mounted to lower ends of the pivot arms and extending transverse to said path between said pivot arms and connected to said framework between said pivot arms for pivotal movement about a second axis substantially perpendicular to said first horizontal axis;

a pair of connecting arms spaced apart transversely in relation to said path and pivotably mounted to the framework and to said blade means for pivotal movement thereon and wherein the pivot axes of the connecting arms are parallel to said first axis and spaced longitudinally along said path from said first axis;

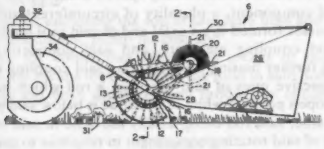
resilient bushing means for mounting the pivot arms and earth engaging blade means to the framework;

drive means interconnecting the pivot arms and framework for imparting an oscillational movement to said blade means about both the first and second axes.

3,993,141
PIN CYLINDER LITTER COLLECTOR

Paul C. Donohue, 1661 Prospect Ave., East Meadow, N.Y. 11554

Filed Nov. 18, 1974, Ser. No. 524,625
Int. Cl.² A01B *43/00*
U.S. Cl. 171—63 12 Claims

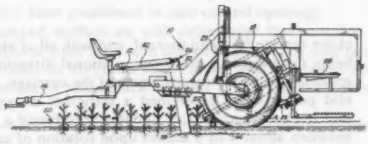


1. A 'litter picker' comprising in combination a frame, a first horizontal shaft rotatably mounted in said frame, means for attaching a plurality of rods radially of said shaft, a plurality of spaced flexible rods attached to said attaching means radially of said shaft, said rods having free ends which terminate in sharp points, said free ends extending beyond the frame and to or into the surface below so as to pierce and engage paper, cardboard, and like litter thereon, said rods also provided with sleeves of resilient material for frictionally engaging litter therebetween, said sleeves being spaced a distance from said sharp points, a second shaft rotatably mounted in said frame rearwardly of said first shaft, means operably connecting said first and second shafts, a litter removing device secured to said second shaft, said device consisting of one or more first or brush sections and one or more second sections, said first or brush sections being made of radially attached brush material, with each said brush section being so aligned and of such a radius as to, upon the cooperative rotation of said first and second shafts, intercept the rod areas at and near the points and beyond the sleeves of a column of rotating rods and remove litter therefrom, said second sections being made of metal, durable plastic, or other suitable material, with each said second section being so aligned and circumscribing, at some part, on rotation, a cylinder or circle of such radius as to, upon the cooperative rotation of the said first and second shafts, rotate between the sleeves of two rotating columns of rods and dislodge litter from therebetween, and a bin for litter collection secured to said frame into which litter is discharged.

3,993,142
TREE SEEDLING HARVESTER

James G. Storms, Garfield, Wash., assignor to J. E. Love Company, Garfield, Wash.

Division of Ser. No. 506,292, Sept. 16, 1974, Pat. No. 3,964,550. This application Aug. 8, 1975, Ser. No. 603,042
Int. Cl.² A01D *33/00*
U.S. Cl. 171—101 3 Claims



1. In a mobile device for harvesting tree seedlings including means for subsurface cutting to separate and loosen from the surrounding ground the body of earth adjoining the roots of said seedlings, means for conveying the seedlings to a receiver, means for removing the body of earth adhering to the roots of said seedlings, supporting frame means, and the improvement wherein said means for subsurface cutting comprises a pair of horizontally spaced apart support arms, a transverse support shaft mounted on said frame, connector means attached to said support arms intermediate their ends and including means journaling said support arms for rotation about said support shaft, a transverse cutter blade interconnected between the lowermost end portions of said spaced apart support arms, and double acting cylinder means pivotally connected at one end thereof to the upper ends of said spaced apart support arms and pivotally connected at the second end thereof to said frame, forwardly of said support arms, said double acting cylinder means serving to swing said support arms and the cutter blade carried thereby between an operative position in which the cutter blade is in the ground and a transport position in which said cutter blade is spaced above the ground, and further serving to brace said support arms and said cutter blade when in said operative position.

3,993,143
TURF RECONDITIONING APPARATUS AND METHOD

John W. Moreland, Jr., 6420 Highway 51, Charlotte, N.C. 28211

Filed Oct. 22, 1974, Ser. No. 517,012
Int. Cl.² A01B *45/02*
U.S. Cl. 172—22 8 Claims

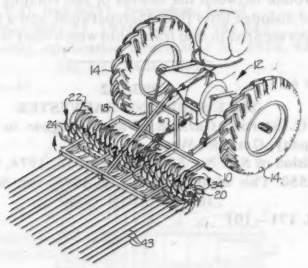
1. A turf reconditioning apparatus characterized by the ability to aerate and relieve the compaction of the soil while

minimizing the power consumption thereof, said apparatus comprising

a carriage having supporting wheels and adapted to traverse the ground to be reconditioned,

a drive shaft rotatably carried by said carriage and defining a substantially horizontal axis positioned above the surface of the ground and extending parallel to the rotational axis of said supporting wheels,

a plurality of cutting discs fixedly carried on said shaft and positioned along substantially the entire length of said shaft in an axially spaced apart relationship, each of said cutting discs comprising a plurality of angularly spaced apart, substantially flat, blades having a thickness between about ⅛ to ¼ inches and extending radially outwardly from said shaft to define a plane lying substantially perpendicular to said horizontal axis, each of said blades including side edges which converge to form a sharp point



at the remote free end thereof, and with all of said points being disposed in a common rotational direction corresponding to the forward traverse of the carriage, and with said points being positioned a sufficient distance from said horizontal axis so as to enter the ground a distance between about 4 to 6 inches upon rotation of said shaft, and

power means for traversing said carriage over the ground and for rotating said drive shaft about said horizontal axis at a predetermined speed of between about 1½ to 3 times the free rolling speed of said drive shaft, and in a predetermined direction with respect to the direction of the traverse of the carriage such that the points of the blades initially enter the ground and then move rearwardly and upwardly to lift a portion of the broken soil onto the surface of the ground and the cutting discs form a plurality of parallel substantially open slits in the ground traversed by the carriage.

3,993,144

ROTARY HARROWS

Cornelis van der Lely, 7, Bruschenrain, Zug, Switzerland

Division of Ser. No. 320,873, Jan. 4, 1973, Pat. No. 3,897,831.

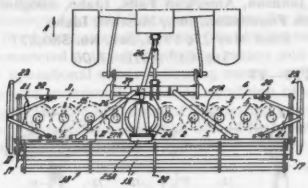
This application May 27, 1975, Ser. No. 580,943

Claims priority, application Netherlands, Jan. 5, 1972, 7200086

Int. Cl.² A01B *33/06*

U.S. Cl. 172—59 **4 Claims**

4. A rotary harrow comprising a frame and a plurality of side-by-side soil-working members rotatably mounted on said frame in a row extending transverse to the direction of travel, each soil-working member being mounted on an upwardly extending shaft and having tine means consisting of a single downwardly extending tine having a lower active portion that is spaced from its respective upwardly extending shaft, the effective radial distance between the active tine portion and the axis of rotation of a corresponding soil-working member being greater than half the distance between the axes of rotation of two neighboring shafts, the active tine portions of adjacent soil-working members being offset substantially 180° from one another about their respective shafts, whereby, a first active portion is disposed as far forwardly as is possible with respect to the direction of travel of the harrow and a



second active portion of an adjacent soil-working member is disposed as far rearwardly as is possible with respect to that direction, the distance between the axes of rotation of two neighboring shafts being about 25 centimeters.

3,993,145

POWER TOOL

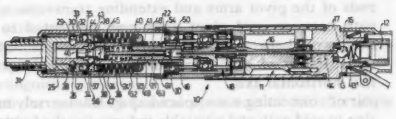
Bernard Findeli, Plobsheim, France, assignor to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed June 14, 1974, Ser. No. 479,492

Claims priority, application Germany, July 18, 1973, 2336477

Int. Cl.² B25D *23/145*

U.S. Cl. 173—12 **9 Claims**



1. A power tool, particularly a power screw driver, wherein the transmission between a drive and a tool holder is automatically terminated when a predetermined torque is exceeded, comprising a housing accommodating a drive, said drive comprising an air motor and a valve connecting said air motor with a source of compressed air and being movable to open position against a biasing force; a tool holder rotatably mounted in said housing; a rotatable component permanently connected with said drive to be rotated by the same, said rotatable component being formed with a transverse bore accommodating a plurality of ball members, and with a longitudinal bore intersecting said transverse bore; and means including coupling means for connecting said tool holder with said rotatable component in torque transmitting relationship and for terminating the transmission when the torque exceeds a predetermined value, said coupling means including a plurality of spherical coupling elements mounted on said rotatable component at fixed circumferentially spaced locations for rotation with said component, a plurality of circumferentially spaced axial recesses formed in an axial end of said tool holder which faces said coupling elements, and said connecting means includng further biasing means urging said coupling elements into respective ones of said recesses, a rod which holds said valve in open position when said torque is below said predetermined value, said rod being axially movable in said longitudinal bore of said rotating component in response to said torque exceeding said predetermined value so that said biasing force can move said valve to said closed position, a member surrounding said rotatable component and being formed with a stepped bore having a portion of larger and a portion of smaller diameter, said member being slidable axially of said rotatable component against the action of said biasing means from a position in which said smaller diameter portion of said bore surrounds said transverse bore and urges said ball members inwardly of the latter to block sliding of said valve rod,

to a position in which said large diameter portion of said bore surrounds said transverse bore and said valve rod displaces said ball members radially outwardly of said transverse bore so as to be slidable in said longitudinal bore, said spherical coupling elements constituting the only drive connection between said component and said tool holder.

3,993,146

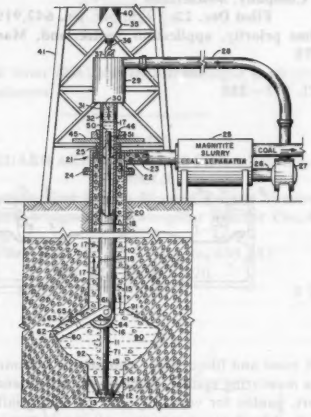
APPARATUS FOR MINING COAL USING VERTICAL BORE HOLE AND FLUID

William N. Poundstone, Pittsburgh, Pa., and William J. Miller, Ponca City, Okla., assignors to Continental Oil Company, Ponca City, Okla.

Division of Ser. No. 392,576, Aug. 29, 1973, Pat. No. 3,824,733. This application Aug. 26, 1974, Ser. No. 500,425

Int. Cl.² E21B *21/00*

U.S. Cl. 175—206 **9 Claims**



1. An apparatus for producing coal from a substantially vertical seam comprising:

means for forming a bore hole substantially vertical in said seam, said bore hole having a bottom;

fluid removal means in fluid communication with said bottom including means for anchoring said removal means at said bottom; coal dislodging means mounted in said bore hole for dislodging said coal a fixed distance from said bore hole;

means for enclosing the top of said bore hole having an outlet communicating therewith; fluid inlet means to said coal dislodging means;

means having a specific gravity greater than that of the coal for floating said coal dislodging by said dislodging means up to said

means for enclosing the top of said bore hole and out of said outlet means; pump means; and

means for connecting said pump means to said fluid removal means for extracting the fluid in said hole after said coal has been dislodged and production is completed.

3,993,147

TAPER LOCK REMOVABLE STEM FOR RAISE BIT

Howard E. Mitchell, Duncanville, Tex., assignor to Dresser Industries, Inc., Dallas, Tex.

Filed Jan. 19, 1976, Ser. No. 650,394

Int. Cl.² E21B *9/24*; E21C *23/00*

U.S. Cl. 175—344 **3 Claims**

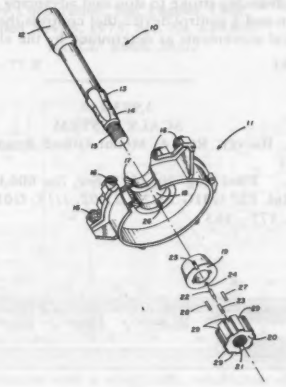
1. A raise bit for enlarging a pilot hole into a larger diameter hole by disintegrating earth formations surrounding the pilot hole, comprising:

a cutter stage body, said cutter stage body having an upper portion and a lower portion;

a multiplicity of saddles mounted on said upper portion of said cutter stage body;

a multiplicity of rolling cutters positioned in said saddles;

a central opening in said cutter stage body, said central opening having a tapered inner surface tapering outward toward said upper portion of said cutter stage body;



a drive stem positioned in said central opening;

a tapered surface on said drive stem that matches said tapered inner surface in said central opening, said tapered surface on said drive stem mating with said tapered inner surface of said central opening in said cutter stage body; and

means for urging said drive stem into said central opening.

3,993,148

METHOD AND DEVICE FOR SUPPLYING A WORM MACHINE WITH MATERIAL-PARTIAL PIECES DOSED BY WEIGHT

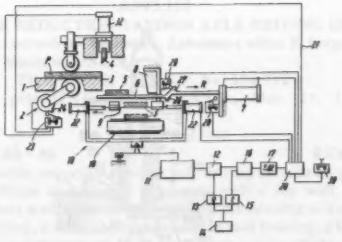
Fridolin Keser, Hemmingen; Wilhelm Seufert, Korntal, and Ralf Urban, Markgroningen, all of Germany, assignors to Werner & Pfleiderer, Stuttgart, Germany

Filed Nov. 27, 1974, Ser. No. 527,846

Claims priority, application Germany, Nov. 27, 1973, 2358970

Int. Cl.² G01G *19/52, 13/24, 13/02*; B26D *5/08*

U.S. Cl. 177—50 **6 Claims**



1. A device for cutting and feeding into the charging funnel of a worm machine strip-shaped or irregularly formed pieces of material to achieve a preselected total weight of material over a definite period of time, especially rubber as a component in a mixture, which includes an electric scale preferably associated with an analog converter, which scale is operable

to furnish inputs to a value comparator and to an electric calculator, said electric calculator being operable to determine the change in the time between cutting and feeding the next piece, an electrically triggered advancing device for handling the cut material between the cutting operation and the weighing operation, said triggered advancing device being reciprocally moved to accept a cut piece and to drop the cut piece on the electric scale, two cams coupled to said advancing device and operable in response to the completion of a preset advancing stroke to stop said advancing device in each direction and a control device that controls the time between reciprocal movements as determined by the electric calculator.

3,993,149

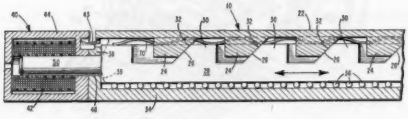
SCALE SYSTEM

John E. Harvey, Rte. 4, Mount Gilead Road, Decatur, Ill. 62521

Filed Aug. 20, 1975, Ser. No. 606,021

Int. Cl.² G01G *21/22*, *21/02*, *1/18*; G01L *5/12*

U.S. Cl. 177—163 **53 Claims**



1. A scale system, comprising:

a. a crown vertically displaceable upon the application of a weight;

b. a center section supporting said crown and constructed to be longitudinally displaceable upon vertical displacement of said crown;

c. a sensing means actuated by said center section upon displacement of said center section for producing an output corresponding to the vertical displacement of said crown; and

d. a bottom section supporting said center section.

3,993,150

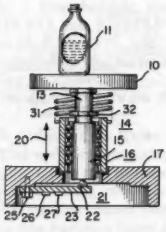
ECONOMICAL WEIGHING APPARATUS EMPLOYING A CANTILEVER BEAM STRUCTURE

Amnon Brosh, Montvale, N.J., and Jacob Wasserman, Bronx, N.Y., assignors to Kulite Semiconductor Products, Inc., Ridgefield, N.J.

Filed May 19, 1975, Ser. No. 578,637

Int. Cl.² G01G *3/14*, *23/14*, *3/08*

U.S. Cl. 177—211 **9 Claims**



1. Apparatus for measuring the weight of an object, comprising:

a. a cantilever beam transducer having a fixed end secured to a reference plane and one end adapted to receive a force, said cantilever beam transducer having a force responsive element positioned on said beam near said end adapted to receive a force, and a terminal assembly positioned on said fixed end with electrical leads coupling said force responsive element to said terminal assembly and directed along the surface of said beam,

b. a linear bearing positioned with respect to said one end of said cantilever beam, said bearing having a central aperture and an inner wall for moving axially with respect to said one end of said cantilever,

c. a rod located within said aperture and having one end coacting with said one end of said cantilever, and

d. means located at said other end of said rod for receiving an object to be weighed.

3,993,151

MASS AND FORCE METER

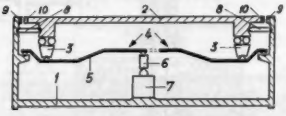
Armin Wirth, Zurich, Switzerland, assignor to Wirth, Gallo and Company, Switzerland

Filed Dec. 22, 1975, Ser. No. 642,919

Claims priority, application Switzerland, Mar. 19, 1975, 3694/75

Int. Cl.² G01L *1/00*

U.S. Cl. 177—255 **1 Claim**



1. A mass and force meter comprising a frame, a load support, a measuring system, stops on the frame and on the load support, guides for vertically and parallel guiding said load support, at least one measuring cell in said measuring system, supporting elements mounted between said load support and said measuring cell and transmitting to said cell substantially vertical forces only, at least one of said guides being elastically deformable under the action of horizontal forces acting on said load support, said elastic deformability of said guide increasing abruptly for a pre-determined value of said horizontal forces, said stops limiting the horizontal movement of said load support under the action of said horizontal forces exceeding said pre-determined value.

3,993,152

AUTOMATIC FOUR-WHEEL DRIVE TRANSFER CASE

Mark J. Fogelberg, Muncie, Ind., assignor to Borg-Warner Corporation, Chicago, Ill.

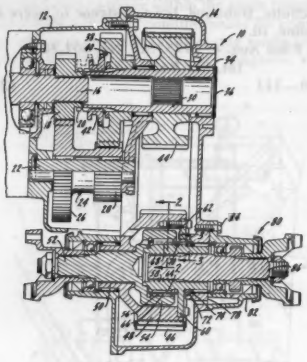
Filed Apr. 28, 1975, Ser. No. 572,690

Int. Cl.² B60K *17/34*

U.S. Cl. 180—44 R **11 Claims**

1. A torque transfer assembly comprising a housing, an input shaft rotatably supported by said housing, first and second output shafts rotatably supported by said housing, means coupling said input shaft with said first output shaft for effecting torque transfer thereto, said first output shaft connected with an inner race having a plurality of wedging surfaces, said second output shaft connected with an outer race having a cylindrical surface, a roller cage in frictional contact with said housing, and a plurality of rollers supported by said roller cage between said races, said rollers being movable relative to said races between a freewheeling position and at least one position wedged between said races for effecting torque transfer to said second output shaft, said coupling

means including a first sleeve driven by said input shaft, and a second sleeve driven with said first sleeve, said second sleeve



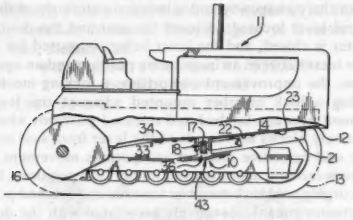
defining said inner race, and said first output shaft driven by one of said sleeves.

3,993,153

BOTTOM GUARD ARRANGEMENT FOR A TRACK-TYPE VEHICLE

David D. Hansen, East Peoria, Ill., and Eugene Sweeney, Sao Paulo, Brazil, assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Dec. 10, 1975, Ser. No. 639,333
Int. Cl.² B62D 25/20
U.S. Cl. 180—69.1 5 Claims



1. A bottom guard arrangement for a track-type vehicle having a longitudinally extending frame, a pair of parallel track assemblies disposed at opposite sides of the frame and an elongated hard bar extending laterally between the track assemblies and pivotally connected to the frame, comprising:

a front guard detachably secured to the frame forwardly of the hard bar;

a rear guard detachably secured to the frame rearwardly of the hard bar and spaced from the front guard;

means forming a transversely extending socket on the front guard;

an intermediate guard having a forward end inserted into the socket, a rearward end, force-transmitting surface means formed thereon at the rearward end, a plurality of holes extending therethrough at its rearward end, and a matching number of recessed pockets circumscribing the holes;

a plurality of bolts individually extending through the holes in the intermediate guard detachably securing the rearward end of the intermediate guard to the rear guard, each of said bolts having a head protectively disposed within the respective pocket; and

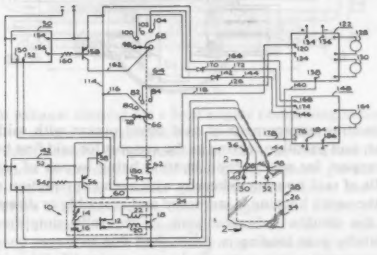
shear block means welded to the rear guard at the rearward end of the intermediate guard for engagement with the force-transmitting surface means to transmit both rearwardly directed longitudinal forces and lateral forces applied to the intermediate guard plate directly to the rear guard.

3,993,154

WHEELCHAIR-MOUNTED CONTROL APPARATUS

Alden C. Simmons, Boulder; James T. McFadden, Arvada, both of Colo., and Robert S. Bennett, Towson, Md., assignors to Whittaker Corporation, Los Angeles, Calif.

Filed Nov. 5, 1975, Ser. No. 629,033
Int. Cl.² B60K 26/02
U.S. Cl. 180—77 R 14 Claims



1. In combination with a wheelchair, wheelchair-mounted control apparatus, which comprises:

a. a periodic energy field source mounted on said wheelchair,

b. energy field radiating means connected to said source and disposed on said wheelchair in a location to be adjacent to major body portions of an individual using said wheelchair, whereby said energy field may be radiated into the wheelchair user's body,

c. a field pickup element mounted to said wheelchair and adapted for receiving said energy field from the wheelchair user's body when the user momentarily contacts said element with his exposed skin,

d. detecting means connected to said element for detecting said energy field received thereby from said wheelchair user, thereby causing detecting means output signals in response to said detected energy field,

e. at least one function performing means mounted in said wheelchair, and

f. controlling means connected to said function performing means and said detecting means for controlling operations of said function performing means in response to said detecting means output signals.

3,993,155

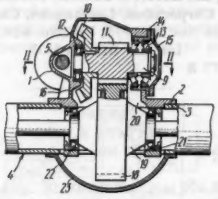
DOUBLE REDUCTION TANDEM AXLE DRIVING UNIT

Jury Alexandrovich Tkachenko, Zatonnaya ulitsa 8, korpus 1, kv. 43, Moscow, U.S.S.R.

Filed Mar. 3, 1975, Ser. No. 554,712
Claims priority, application U.S.S.R., Mar. 11, 1974, 2004247
Int. Cl.² B60B 37/00
U.S. Cl. 180—88 4 Claims

1. A double reduction tandem axle driving unit for an automotive vehicle comprising: a housing with a top wall, side walls, a front wall and a flange to secure the housing to a drive axle's housing, a drive shaft journalled in said housing; a bevel pinion on said drive shaft; a cross-shaft being journalled in said front and back walls of said housing at generally right angles to said drive shaft; a bevel gear on said cross-shaft, said bevel gear being in permanent mesh with said bevel pinion of said drive shaft; a spur pinion on said cross-shaft in close proximity to said bevel gear; a spur gear secured to a carrier of a differential mechanism for said drive axle, said spur gear being in

permanent mesh with said spur pinion; said flange being provided with an aperture for passing said bevel gear and said spur gear; a first bearing disposed at the end of said cross-shaft where said bevel gear is located; a second bearing disposed at the opposite end of said cross-shaft where said spur pinion is located; a partition inside said housing, passes between said drive shaft and said cross-shaft from said top wall to said flange, said partition being provided with an aperture for



permitting engagement of said bevel pinion with said bevel gear; said partition serving as the support for said first bearing; a support for said second bearing being in one of said side walls of said housing; whereby with such construction rigidity of the unit's housing is increased and assembly or disassembly of the double reduction unit is generally simplified, and whereby gear loading is diminished due to larger bevel gear sizes resulting in a generally longer service life for said unit.

3,993,156

GUIDANCE SYSTEM FOR GUIDING TRACKLESS VEHICLES ALONG A PATH DEFINED BY AN A-C ENERGIZED CONDUCTOR

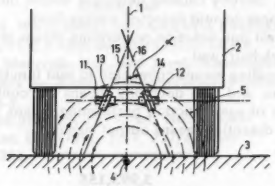
Erich Rubel, Burgstetten, Germany, assignor to Robert Bosch G.m.b.H., Stuttgart, Germany

Filed Jan. 21, 1976, Ser. No. 650,917

Claims priority, application Germany, Feb. 19, 1975, 2506961

Int. Cl.² B62D *1/24*

U.S. Cl. 180—98 **10 Claims**



1. Guidance system for guiding a trackless vehicle to operate on a surface (3) along a path defined by a guide conductor (4) located on or in the surface and having an a-c flowing therein and an a-c field thereabout, comprising

at least two horizontal coils (11, 12) located on the vehicle and having a common horizontal winding axis (18), positioned symmetrically with respect to a vertical longitudinal central plane of symmetry (1) between the wheels of the vehicle (2);

and two auxiliary coils (13, 14) respectively located adjacent the horizontal coils (11, 12) and symmetrical with respect to said longitudinal plane of symmetry, and having winding axes (15, 16) located at least approximately in a common vertical plane transverse to said longitudinal plane, each coil including an acute angle (α), open towards a conductor (4) with said longitudinal plane of symmetry (1).

3,993,157

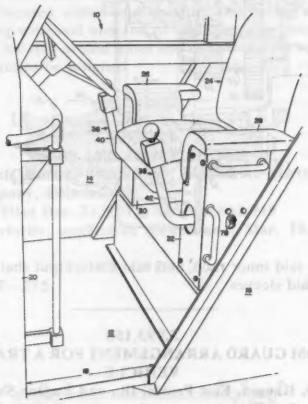
DOOR OPERATED CONTROL LEVER LATCH MECHANISM

Gary Lee Schulte, Dubuque, Iowa, assignor to Deere & Company, Moline, Ill.

Filed Aug. 4, 1975, Ser. No. 601,381

Int. Cl.² B60K *28/00*

U.S. Cl. 180—111 **12 Claims**



1. In a vehicle having an enclosed cab in which is located a seat, a passageway leading from one side of the cab to the seat, a door forming a portion of the cab at said one side and mounted for movement between open and closed positions for respectively allowing and preventing an operator to move between the passageway and a location exteriorly of the cab, a control lever located adjacent the seat and the door when the latter is closed, and the lever being supported for movement at least between an inoperative position and an operative position, the improvement comprising: a locking mechanism including a lock member mounted adjacent the lever for movement between latched and released positions wherein it respectively blocks movement of the lever from said inoperative to said operative position and permits movement of the lever between said operative and inoperative positions; biasing means urging said lock member towards said latched position, and actuator means operatively associated with the door for holding said lock member in said released position only when the door is closed.

3,993,158

DEVICE FOR LIMITING IN A CONTACT-FREE MANNER THE MOVEMENT OF HYDRAULICALLY OPERABLE MECHANICAL PARTS

Armin Weight, Wandofen, Schwerte, and Heinz-Walter Warnke, Bremen, both of Germany, assignors to O & K Orenstein & Koppel Aktiengesellschaft, Berlin, Germany

Filed Jan. 2, 1976, Ser. No. 646,258

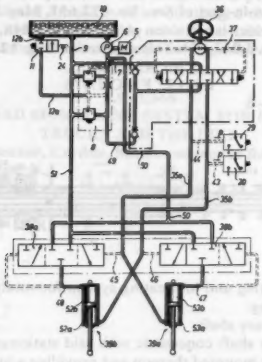
Claims priority, application Germany, Jan. 3, 1975, 2500137

Int. Cl.² B62D *5/06*

U.S. Cl. 180—134 **2 Claims**

1. A device for a contact-free limitation of the the movement of hydraulically operable mechanical elements, especially a steering device for bucket wheel loaders, which includes: a front carriage, a rear carriage pivotally connected to said front carriage for pivotal movement relative thereto about a vertical axis, two thyristors arranged on opposite sides of said vertical axis, two approaching initiators arranged on one of said carriages and on opposite sides of said axis while respectively being associated with said thyristors, a fluid reser-

voir, a steering pump, cylinder-piston means operatively connected to one of said carriages for angularly moving the same relative to the other carriage within the angle range defined by said approaching initiators, conduit means for conveying fluid from said reservoir through said steering pump to said cylinder-piston means and vice versa, and magnetic valve means



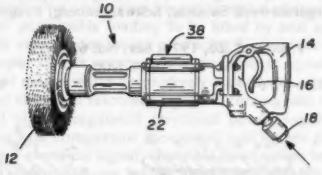
arranged in said conduit means and controlled by said thyristors whereby in response to an angular approach of one of said carriages relative to the other carriage the respective pertaining thyristor is triggered by said respective approach initiator and said magnetic valve is energized and establishes connection of said steering pump with said tank.

3,993,159

MUFFLER FOR A GOVERNED PNEUMATIC TOOL

German Amador, Houston, Tex., assignor to Dresser Industries, Inc., Dallas, Tex.

Filed Jan. 6, 1975, Ser. No. 538,989
Int. Cl.² F01N *3/06*
U.S. Cl. 181—36 A **7 Claims**



1. In a speed governed pneumatic tool including an air motor, an inlet for receiving a supply of pressurized air for operating said motor, and an outlet for discharging air exhausted by said motor, a muffler for reducing the sound level of said exhaust air and comprising:

a. a body having discharge apertures selectively located in a wall thereof and forming an inward cavity substantially enclosing said outlet;

b. a foraminous baffle plate supported in said cavity at an intermediate location in the path of air discharge between said outlet and said body apertures; and

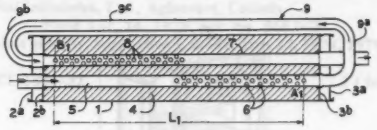
c. a bypass passage defined extending operatively parallel with said baffle plate for bypassing at least a predetermined minimum percentage of total air flow being discharged through said outlet, said bypass is located between at least a peripheral edge portion of said baffle plate and the internal body wall surface thereat.

3,993,160

SILENCER FOR A HEAT ENGINE

Jean Rauch, Bart, France, assignor to Automobiles Peugeot, Paris and Regie Nationale des Usines Renault, Boulogne-Billancourt, both of France

Filed Oct. 22, 1975, Ser. No. 624,903
Claims priority, application France, Nov. 12, 1974, 74.37304; Mar. 3, 1975, 75.06550
Int. Cl.² F01N *1/04, 1/06*
U.S. Cl. 181—53 **17 Claims**



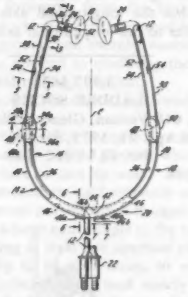
1. An exhaust silencer for a heat engine comprising in combination a closed case, at least two perforated tubes extending in said case, namely an upstream tube and a downstream tube with respect to the direction of flow of the exhaust gases and through which tubes exhaust gases travel in series, and an outer return tube outside the case through which return tube at least a fraction of the exhaust gas stream travels, the return tube being part of means for putting a downstream end of the upstream tube and an upstream end of the downstream tube in communication with each other.

3,993,161

ACOUSTIC HEADSETS

Sidney X. Shore, 29 Wren Drive, Roslyn, N.Y. 11576

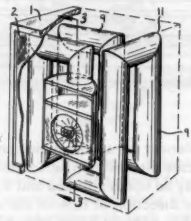
Filed Oct. 8, 1975, Ser. No. 620,633
Int. Cl.² A61B *7/02*
U.S. Cl. 181—135 **12 Claims**



12. A resilient frame having end portions connected to resilient arms spaced apart and arranged to support earpieces of an acoustic headset and to bias earpieces of the headset toward the ears of a wearer, said arms being formed largelv of inner and outer pairs of opposed strips, the opposed strips being spaced apart for receiving acoustic tubes therebetween, said inner strips being disposed closer to a centerline between the spaced-apart arms than said outer strips, said strips including first and second inner strips disposed in series and having respective first and second end portions adjacent each other and said strips including third and fourth outer strips disposed in series and opposed to said first and second strips, respectively, and having respective third and fourth end portions adjacent each other, a first cross-connector uniting said first and fourth end portions of said strips and a second cross-connector uniting said second and third end portions of said strips, said cross-connectors forming the sole connections

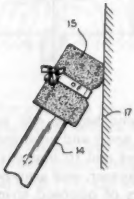
between said strips in the region of said first, second, third and fourth end portions of the strips.

3,993,162
ACOUSTIC SPEAKER SYSTEM
Kenneth Juuti, R.R. No. 1, Port Washington, British Columbia, Canada V0N-2T0
Filed June 20, 1975, Ser. No. 588,724
Int. Cl.² H05K 5/00; G10K 13/00
U.S. Cl. 181—156 7 Claims



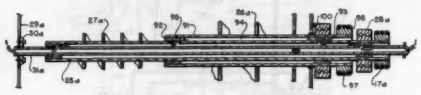
1. A sound speaker enclosure comprising:
an outer housing;
(means defining) a single chamber within and separate from the housing having a first and second cavity the cavities separated by a solid baffle;
a sound speaker mounted within the first cavity;
a plurality of alternately vertical and horizontal tube sections connected in series within the housing and interposed between the first cavity of the chamber and the second cavity;
the tube sections defining a single continuous alternately vertical and horizontal closed sound path between the cavities;
the path including at least three successive tube sections joined so that the longitudinal axis of each section is perpendicular to the longitudinal axis of the other two.

3,993,163
LADDER SOCKS
Donald Barrett, 618 Vernon, Glencoe, Ill. 60022
Filed Apr. 21, 1975, Ser. No. 570,280
Int. Cl.² E06C 7/48
U.S. Cl. 182—108 4 Claims



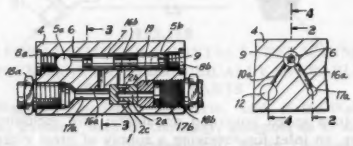
1. A universal protective pad for ladders having side rails, said protective pad comprising:
a pad member fashioned of single pliable, resilient material;
said pad member shaped to overlappingly encircle and protect the entire periphery of a selected portion of one of said side rails; and
strap means attached to points on only one of the surfaces of said pad means, said points removed from the edges of said pad means,
said strap means passing about the entire periphery of said protective pad to secure said pad at any point along one of said side rails even when said pad means overlapping encircles the side rails.

3,993,164
MOUNTING AND LUBRICATING SYSTEM FOR ROTATING MACHINERY
Kenard D. Brown, 1227 S. Willow St., Casper, Wyo. 82601
Continuation-in-part of Ser. No. 472,651, May 23, 1974, abandoned, which is a division of Ser. No. 231,148, March 21, 1972, Pat. No. 3,812,654. This application Aug. 12, 1974, Ser. No. 496,818
Int. Cl.² F16C 17/16
U.S. Cl. 184—6 10 Claims



3. A mounting and lubricating system for rotating machinery comprising:
a. a stationary shaft;
b. a hollow shaft concentric with said stationary shaft and rotatably mounted thereon and providing a longitudinally extending annular space between the shafts;
c. said mounting including bearings near the ends of said hollow shaft;
d. seals arranged between said shafts for preventing the loss of lubricant from said annular space;
e. means for supplying liquid lubricant under pressure to the annular space between said shafts and to said bearings for maintaining said space filled with lubricant under pressure, said lubricant acting to damp vibrations of said hollow shaft during rotation thereof, and
said stationary shaft being hollow and said lubricant under pressure being supplied first to the interior of said stationary shaft and thence to said annular space.

3,993,165
LUBRICANT DOSING DEVICE
Erhard Pöttrick, Konigswalde, Germany, assignor to VEB Schmiergeratewerk Saxonia, Schwarzenberg, Erzgeb., Germany
Filed Oct. 20, 1975, Ser. No. 623,579
Int. Cl.² F01M 1/06
U.S. Cl. 184—7 F 9 Claims



1. A lubricant dosing device for double-action two-conduit central lubricating systems, comprising: a housing having a main axis; a pair of pressurized lubricant inlets and a pair of outlets for predetermined dosed amounts of the lubricant in said housing; two elongated piston chambers defined by portions of said housing in a substantially parallel but spaced-apart relationship and having respective longitudinal axes; a control piston in one of said chambers, acted upon by the introduced pressurized lubricant, reciprocable between two discrete operative positions; a dosing piston in the other of said chambers, reciprocable between two extreme positions, to force the predetermined dosed amounts of the lubricant to at least one of said outlets; a pair of spaced-apart channels interconnecting said chambers; a pair of spaced-apart dis-

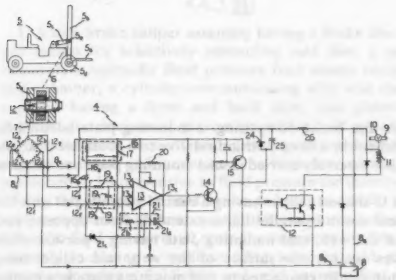
charge bores leading from said one chamber to an elongated outlet control chamber also formed in said housing and having a longitudinal axis; and a closing member with a main axis, being insertable in a portion of said control chamber in two opposite, axially oriented operative positions, and including means for selectively discharging the dosed lubricant through only one of said outlets when said closing member is inserted into said control chamber in one operative position, and allowing the dosed lubricant to be discharged through both of said outlets when said closing member is inserted into said control chamber in the other operative position.

3,993,166

OVERLOAD SIGNALLING SYSTEM FOR FORK LIFT TRUCKS AND THE LIKE

Donald A. Senour, Carlisle, Mass., assignor to Bofors America, Inc., Linden, N.J.

Filed Apr. 29, 1975, Ser. No. 572,715
Int. Cl.² B66B *9/20*
U.S. Cl. 187—9 R **6 Claims**



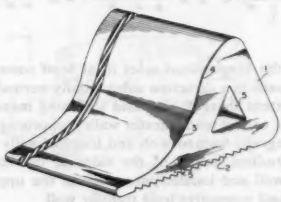
1. Automatic equipment for prevention of overloaded operation of load-lifting apparatus, comprising electrically-actuated means for interrupting supply of load-lifting power by said apparatus, said interrupting means being electrically exictable to allow said supply and normally interrupting said supply in the absence of a predetermined electrical excitation, transducer means producing electrical output signals characterizing the extents of loading being lifter by said apparatus, means producing a reference electrical signal characterizing a maximum permissible loading to be lifted by said apparatus, electronic comparator means producing first and second electrical output signals responsive to said output signals of said transducer means which respectively exceed and are less than combined electrical reference signals including said reference electrical signal, regulated electrical power supply means energizing said comparator means and said means producing a reference electrical signal, electrical filter means interposed between said transducer means and said comparator means and smoothing out components of signals admixed with said output signals of said transducer means which are high in frequency relative to expected frequencies of oscillations of loading of said apparatus sensed by said transducer means, DC feedback means supplying from said first and second signals and as one of the signals of said combined reference signals a signal which is but a relatively small percentage of the value of said reference signal, unidirectional AC feed-back means supplying from said first signal and as one of the signals of said combined reference signals a signal which decays to substantially zero from a relatively high percentage of the value of said reference signal in several seconds following each occurrence of said first signal and which supplies only an insignificantly short signal from said second signal as one of the signals of said combined reference signals following each occurrence of said second signal, and means responsive only to said first signals from said comparator means withholding said predetermined electrical excitation from said interrupting means to interrupt said supply of load-lifting power and thereby disabling said apparatus during each occurrence of one of said first signals, whereby mechanical and electromagnetic noise and mechanical oscillations falsely simulating overloading of said apparatus are automatically counteracted in tendencies to falsely disable said apparatus for more than several seconds and said apparatus tends to fail safe upon occurrence of a malfunction.

3,993,167

WHEEL CHOCK

Wesley Bram Reed, West Hill, Canada, assignor to Suburban Metal Industries, Ltd., Agincourt, Canada

Filed Apr. 14, 1975, Ser. No. 568,048
Claims priority, application Canada, Apr. 22, 1974, 197929
Int. Cl.² B60T *3/00*
U.S. Cl. 188—32 **2 Claims**



1. A chock to be placed against a vehicle wheel for restraining the wheel against movement in one rolling direction, said chock having a bottom ground-engaging surface, a front surface intended to face generally towards a wheel to be engaged by the chock, a rear surface intended to face generally away from said wheel and in said rolling direction, and opposite side faces, said chock being characterized by:

A. said chock consisting of a unitary mass of a tough and resilient material;

B. said chock having an integral forwardly tapering lip which projects forwardly from the bottom of its front surface and onto which a wheel can readily roll to trap the lip against the ground and thereby enable the weight of the wheel to be applied to confining the chock against movement in said rolling direction;

C. said front surface of the chock, as viewed from the sides of the chock, having

1. an upper portion which is convexly curved,
2. a lower concavely curved portion which merges with the upper surface of said lip, and
3. a portion intermediate said convexly curved and said concavely curved portions that merges with them and is disposed at a large acute angle to the horizontal; and

D. said chock having at least one aperture extending therethrough, opening to its side faces, to enable its front surface to be resiliently deformed mainly in said rolling direction under the force of a wheel tending to roll in said rolling direction, to thus cause increasing areas of the front surface to be brought into contact with the periphery of the wheel as the wheel exerts increasing force upon the chock in said rolling direction.

3,993,168

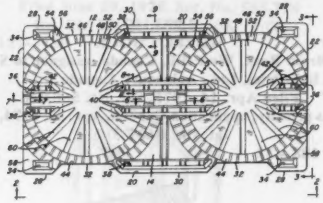
PALLET

Mark Kubick, Baden, Pa., assignor to Pallet Development Inc., Ambridge, Pa.

Filed Mar. 7, 1974, Ser. No. 449,099
Int. Cl.² B65D *19/32*, *19/44*
U.S. Cl. 108—53.1 **3 Claims**

1. A reversible pallet formed for resinlike material comprising: a first wall adapted to receive a load thereon; a second wall adapted to receive a load thereon, vertically spaced from said first wall and extending in a plane generally parallel thereto; a substantially vertical wall extending substantially

continuously between said first and second walls adjacent the respective outer peripheries thereof; at least one elongated vertically aligned opening in said first and second wall intermediate said outer peripheries thereof; an integrally formed substantially vertical load transfer wall extending continuously between said first and second walls adjacent the peripheries of each of said openings; stiffening means extending transversely



between the longitudinal sides of at least some of said load transfer walls in a direction substantially normal to the longitudinal extent thereof; and said stiffening means for said at least some of said load transfer walls comprising a plurality of struts integrally formed with and longitudinally spaced along the longitudinal extent of the sides of the respective load transfer wall and located intermediate the upper and lower sides of said respective load transfer wall.

3,993,169

LOCKING DEVICE

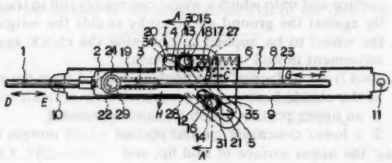
Masanao Baba, Takarazuka, Japan, assignor to Nippon Cable System Inc., Japan

Filed Nov. 20, 1975, Ser. No. 633,698

Claims priority, application Japan, May 20, 1975, 50-60496; July 3, 1975, 50-82482

Int. Cl.² F16D *63/00*

U.S. Cl. 188—67 **7 Claims**



1. A locking device comprising:

a fixed locking plate means which has an arbitrary length and locking flanks on both sides thereof,

a locking member means, being located inclining to the longitudinal axis of said locking plate means, provided with two contact members which define locking flanks with which said locking flanks of said locking plate means contact and two pins secured to said locking member means,

a drive plate means which has contact sides formed at about right angles to the longitudinal axis of said locking plate means, with which said pins contact, and a drive shaft connected to said drive plate means,

an operating plate means which has a sliding flank, parallel to said longitudinal axis of said locking plate, along which one of said pins of said locking member slides and another sliding flank, inclined to said first mentioned sliding flank, along which the other of said pins of said locking member means slides, and a driven shaft connected to said operating plate, and

a resilient means to press said contact members against said locking flanks of said locking plate means.

3,993,170

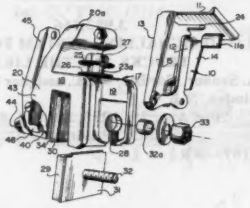
SELF ADJUSTING FLOATING CALIPER DISC BRAKE

Normand Lessard, Valcourt, Canada, assignor to Bombardier Limited, Valcourt, Canada

Filed Oct. 28, 1975, Ser. No. 626,542

Int. Cl.² F16D *55/02*

U.S. Cl. 188—71.9 **6 Claims**



1. A disc brake comprising: a mounting plate adapted for attachment in a fixed position relative to a rotatable disc; and a caliper assembly carried in said mounting plate and comprising:

a. a U-shaped caliper having a central web integral with first and second parallel limbs extending from opposite ends of the web, said mounting plate having a portion which lies against one surface of the web, said caliper being non-rigidly connected to said mounting plate in a manner permitting a limited floating movement of the caliper relative thereto by a connection comprising a fastener having a head engaged in a recess in the caliper web and a shank extending through an elongated slot in said plate portion extending parallel to the axial direction of the disc, and resilient clamping means connecting said fastener to said mounting plate portion such that said caliper is floatingly supported thereon,

b. first and second brake pads of frictional material associated each with a respective one of said limbs and carried in spaced parallel relationship between said limbs, said first pad being fixed in relation to said first limb, said second pad being carried on a backing plate attached to a mounting member guided in a bore in the second limb, and being movable towards and away from said first pad,

c. said mounting member having a screw-threaded portion extending beyond said second limb and in threaded engagement in a cap which is rotatable thereon,

d. said caliper providing a pivotal mounting for an actuating lever operatively associated with said cap and pivotable from a released position wherein said second brake pad is retracted, to an applied position wherein said second pad is moved towards said first pad,

e. spring means in said assembly operative to urge said second pad away from the applied position, and

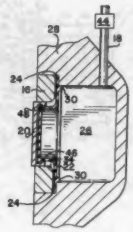
f. automatic adjustment means comprising a peripheral ratchet on said cap defining a series of ratchet teeth and a cooperating pawl carried by said lever and engaging said ratchet to be movable generally longitudinally of said ratchet upon movement of said lever to the applied position, such that when in that movement the pawl passes over a tooth of said ratchet, subsequent return of said lever to the released position causes said pawl to engage and move that tooth producing an incremental rotation of said cap relative to said second brake pad and a corresponding adjustment in the retracted position of the second brake pad.

3,993,171

FLUID SEAL PISTON AND CYLINDER ASSEMBLY FOR A DISC BRAKE

Erwin W. Tonn, 7734 S. Christiana, Chicago, Ill. 60652

Filed May 21, 1975, Ser. No. 579,470
Int. Cl.² F16D 55/18
U.S. Cl. 188—72.4 1 Claim



1. A disc brake caliper assembly having a brake disc, brake pad means for selectively contacting said disc, a pressure chamber, a hydraulic fluid pressure feed means coupling to said chamber, a cylinder communicating with said chamber, a piston having a front and back face, said piston being mounted for reciprocal movement within said cylinder and having the front face of said piston positioned adjacent a respective brake pad means and the back face of said piston positioned to be responsive to fluid pressure for thereby transmitting the pressure to said brake pad means which, in turn, apply a pressure to the associated disc in response to increased hydraulic fluid pressure, wherein the improvement lies in said assembly including a resilient plate adjacent said pressure chamber forming a fluid-tight seal, and having a first surface in contact with said hydraulic fluid and an opposite surface, a central portion of said opposite surface adhesively united with the back face of said piston and a peripheral portion of said opposite surface united with said cylinder, said piston having on the periphery of said back face an inwardly directing flange on a plane substantially parallel to said back face for cooperation with the adhesive engagement of said central portion of said opposite surface in uniting said resilient seal plate to said back face of said piston, whereby the pressure exerted against said first surface of said resilient plate by said fluid for actuation of said brake disc concurrently prevents loss of said fluid through said cylinder.

3,993,172

COOLED, EXTERNALLY ENGAGED DRUM BRAKE

Peter H. Schmitz, Bahnhofstr. 8, 4401 Altenberge, Westphalia, Germany

Continuation of Ser. No. 469,000, May 10, 1974, abandoned.
This application Aug. 25, 1975, Ser. No. 607,453
Int. Cl.² F16D 49/00
U.S. Cl. 188—75 3 Claims

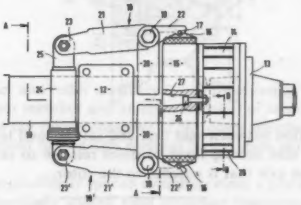
1. An improved trailer brake for motor vehicle trucks having an axle that has at least one tire mounted on a wheel rim attached to one end of the axle by a wheel hub and that has a longitudinal axis about which the wheel hub, wheel rim and tire rotate, comprising:

a brake ring connected with the wheel hub and wheel rim for rotation with the wheel hub, wheel rim and tire about the longitudinal axis of the axle, the brake ring having a radially outwardly directed, external, peripheral braking surface thereon that is spaced radially inwardly from the wheel rim and tire and that is spaced axially, with respect to the longitudinal axis of the axle, from the wheel hub;

at least one brake shoe having a braking surface thereon, the brake shoe being mounted so as to be adjacent to and radially outwardly from the brake ring and so as to be adjacent to and radially inwardly from the wheel rim and tire and having its braking surface disposed so that it may mate with at least a portion of the external peripheral braking surface of the brake ring;

hydraulic operating means mounted adjacent to the longitudinal axis of the axle at a point spaced axially, with respect to the longitudinal axis of the axle, from the brake ring, the wheel hub, the wheel rim and tire; and

lever means extending between the hydraulic operating means and the brake shoe for connecting the hydraulic operating means with the brake shoe and for moving the braking surface of the brake shoe into braking contact with the external peripheral braking surface of the brake ring upon actuation of the hydraulic operating means, the lever means including: pivot means mounted on the axle at a point spaced between the hydraulic operating means and the radial plane in which the brake ring, wheel rim



and tire are disposed; and a two-arm lever which includes a first arm and a second arm and which is connected with the pivot means for pivotable movement about a pivot axis transverse to the longitudinal axis of the axle so that each arm of the two-arm lever pivotably moves in a plane generally parallel to the longitudinal axis of the axle, with the first arm of the two-arm lever being disposed in a plane generally parallel to the longitudinal axis of the axle and having one of its ends operatively connected with the brake shoe and the other of its ends operatively connected with the pivot means, and with the second arm of the two-arm lever being disposed in a plane generally aligned with the longitudinal axis of the axle and having one of its ends operatively connected with the hydraulic operating means and the other of its ends operatively connected with the pivot means.

3,993,173

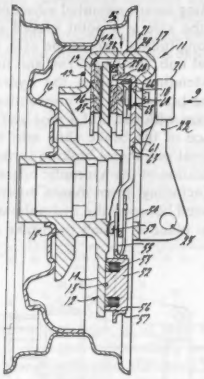
ELECTRICALLY OPERATED DISK BRAKE

Neil R. Hoffman, Saukville, Wis., assignor to Kelsey-Hayes Company, Romulus, Mich.

Filed Sept. 11, 1972, Ser. No. 288,136
Int. Cl.² F16D 65/34
U.S. Cl. 188—138 10 Claims

1. An electrically operated disk brake assembly for braking the rotation of an associated rotor having an annular braking surface disposed generally in a plane perpendicular to its axis of rotation, an electromagnetic element juxtaposed to said rotor, means for supporting said electromagnetic element for movement relative to the rotor in a direction having at least a component that extends parallel to the axis of rotation of the rotor and for at least limited rotation about said axis, actuating means for selectively generating an electromagnetic force for moving said electromagnetic element and the rotor axially relative to each other for limited rotation of said electromagnetic element with the rotor, a brake pad, means for supporting said brake pad for movement into engagement with the rotor braking surfaces, and means for translating rotary movement of said electromagnetic element into movement of said brake pad into engagement with the rotor braking surface, including a first lever carrying said electromagnetic element, a second lever operatively associated with the first brake pad, means for supporting said first and said second levers for

simultaneous pivotal movement about an axis that extends parallel to the rotor axis and means providing an operative



connection between said first and said second levers for permitting said second lever to pivot relative to said first lever about an axis that is parallel to the rotor.

3,993,174

HYDRAULIC BICYCLE BRAKE SYSTEM

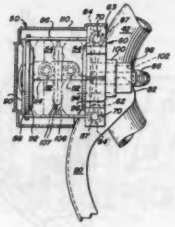
Lynn A. Williams, Winnetka; George P. Costello, Evergreen Park, and Leonard R. Malkowski, LaGrange, all of Ill., assignors to Lynn A. Williams Engineering Company, Elk Grove Village, Ill.

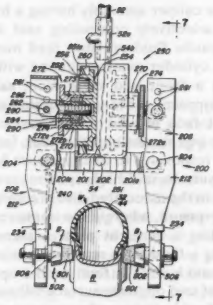
Continuation-in-part of Ser. No. 419,498, Dec. 6, 1973, abandoned. This application Apr. 11, 1974, Ser. No. 459,877

Int. Cl.² B60T *11/24;* **B62L** *3/02*

U.S. Cl. 188—344 **16 Claims**

1. A hydraulic bicycle brake system which comprises: means defining an actuating zone, said means being adapted to be attached to a bicycle; a first pressure plate located at one end of said actuating zone and axially movable within said zone; a second pressure plate fixedly attached to said first mentioned means at the opposite end of said zone; means adapted to move said first pressure plate axially in said actuating zone toward said second pressure plate; two independent hydraulic circuits, each circuit including only two expansible capsules, one being a compressor capsule and one an expansion capsule, said two capsules in each circuit being interconnected by tubing to provide communication therebetween, each of said circuits being sealed and charged with hydraulic fluid, the compression capsule of each circuit being positioned between said first and second pressure plates in juxtaposed relationship, each of said capsules having two generally parallel main walls, the external surfaces of said two main walls together constituting the major portion of the external surface of the capsule, the compressor capsule of each of said two hydraulic circuits being arranged with one of its said main wall external surfaces in close adjacent relationship with one of the main wall external surfaces of the other of said compressor capsules, thereby the compressor capsules between said plates are simultaneously compressed in an axial direction when said first pressure plate is moved axially toward said second pressure plate; a pair of elongated, spaced apart brake links adapted to be mounted adjacent each wheel of a bicycle, each of said links carrying a brake shoe at one end adapted to be positioned adjacent the rim of a bicycle wheel and being pivotally attached at its midportion to pivot means disposed transversely between said links; housing means located between the ends of each pair of said brake links opposite said one end thereof, the expansion capsule in each of said hydraulic circuits being positioned in said housing means; third and fourth pressure plates on opposite sides of said capsule within said housing means and adjacent said respective opposite ends of said links; means interposed between said housing and each of said latter pressure plates for resiliently biasing said pressure plates inwardly of said housing into engagement with the external surfaces of said two main walls of their associated expansion capsule; and means for pivotally attaching each of





said latter pressure plates to its respective link, whereby compression of said capsules in said actuating zone causes simultaneous expansion of the capsules in said two housing means to pivot the brake shoes on said links into braking engagement with the rim of a bicycle wheel while each of said two housing means and members associated therewith freely follow the lateral movement of their respective bicycle wheel rim.

3,993,175

CONTROL LEVER ASSEMBLY FOR POWER SHIFT TRANSMISSION AND MODULATING CLUTCH

Paul J. Beveridge, Springfield, Ill., assignor to Fiat-Allis Construction Machinery, Inc., Deerfield, Ill.

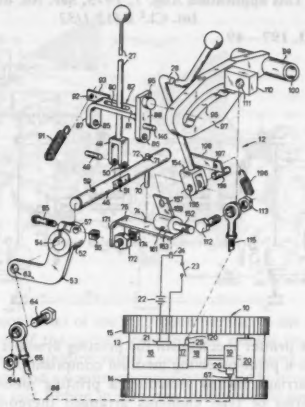
Filed Oct. 23, 1974, Ser. No. 517,178

Int. Cl.² B60K *29/00, 21/00*

U.S. Cl. 192—3.57 **27 Claims**

1. In a control lever assembly for operating a shift selector valve for shifting a power shift transmission into a selected speed range and for operating a clutch control valve for a modulating main clutch to achieve speed changes in the selected speed range: a support; a shaft oscillatably mounted on said support to operate said shift selector valve; a bracket member pivotably mounted on said support and having an aperture therein; cam means comprising two relatively movable interengageable cam components, one cam component being connected to and movable with said bracket member, the other cam component being mounted for movement on said support and connected to operate said clutch control valve in response to movement of said bracket member; and a control lever pivotally mounted on said shaft and extending through said aperture in said bracket member, said control lever being movable in one direction in said aperture to rotate said shaft and effect operation of said shift selector valve

without effecting movement of said bracket member, said control lever being further movable in another direction to



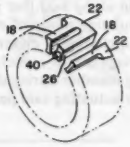
pivot said bracket member and effect operation of said clutch control valve.

3,993,176

OVERRUNNING CLUTCH

Americo E. Marola, Torrington, and John R. Hull, Litchfield, both of Conn., assignors to The Torrington Company, Torrington, Conn.

Filed Aug. 18, 1975, Ser. No. 605,632
Int. Cl.² F16D 3/34
U.S. Cl. 192—45 7 Claims



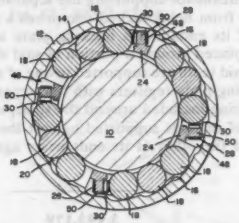
1. An overrunning clutch comprising: an outer member containing an internal bore and at least one radially, inwardly extending flange; a second member located within said bore and having a smaller outside diameter than the diameter of said bore to provide an annular space between said members; a cage in said annular space with pockets for receiving rolling members; at least one rolling member in at least one of said pockets; a rolling member biasing portion included as a part of the cage; biasing portion cooperating means on the radially, inwardly extending flange adapted to cooperate with the rolling member biasing portion of the cage for biasing the rolling members; the outer member having a plurality of cam surfaces for cooperating with the rolling members to wedge and lock said rolling members between said outer and inner members when said rolling members are urged in a given rotary direction.

3,993,177

OVERRUNNING CLUTCH AND RETAINER AND ROLLER ASSEMBLY THEREFOR

Gerard William Gehrke, Litchfield, Conn., assignor to The Torrington Company, Torrington, Conn.

Filed Sept. 8, 1975, Ser. No. 611,258
Int. Cl.² F16D 41/06
U.S. Cl. 192—45 8 Claims



1. A retainer and roller assembly for an overrunning clutch having an outer member and an inner member of less outside diameter than the inside diameter of the outer member with the outer member having cam surfaces on its inside periphery comprising:

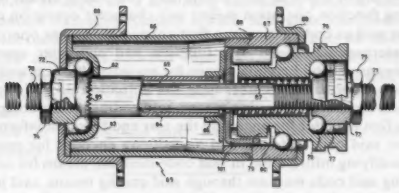
a pair of longitudinally spaced stationary rims; a plurality of circumferentially spaced rigid crossbars interconnecting the rims, the longitudinally spaced rims and the crossbars defining pockets sufficiently large to contain a plurality of rollers, a plurality of rollers in each of said pockets; and a flexible spring associated with each of the crossbars, said spring being adapted to contact the nearest roller in the pocket and urge said contacted roller circumferentially toward the lockup position.

3,993,178

FREE-WHEELING MECHANISM

Hector Mendoza-Orozco, Adolfo Prieto 1709, Mexico City 12, Mexico

Continuation-in-part of Ser. No. 409,106, Oct. 24, 1973, abandoned. This application Feb. 28, 1975, Ser. No. 554,269
Claims priority, application Mexico, Sept. 17, 1973, 146212
Int. Cl.² F16D 23/00
U.S. Cl. 192—64 1 Claim



1. A free wheeling mechanism comprising a shaft having threaded ends; two fixed cones coupled to the threaded ends of said shaft; a movable cone coupled to one end of said shaft, which movable cone includes, at one of its ends, a hollow center portion registering with one of said fixed cones and forming with it a raceway, and which movable cone has its other end opposite to that including the hollow portion as a toothed head; a set of rollers supported on said toothed head; separating means including slots, coupled to said shaft for maintaining separated said rollers such that free wheeling occurs when said rollers do not project through said slots; a cup coupled to the end of said shaft opposite to that end including the movable cone, with cup registers with the other fixed cone forming with it a raceway; bearings running in said

raceways; a hub coupled to said shaft housing each and every of the preceding parts, which hub comprises a hollow cylindrical body as a central part thereof and two plates ending said hollow cylindrical body, which plates support spokes; and means for supporting said separating means and preventing it from being locked when the set of rollers are allowed to escape contact with the hub wherein said hollow cylindrical body of the hub comprises two interengaged tubular portions, and said means for supporting the separating means and preventing it from being locked comprises a sleeve having teeth at one of its ends and a backing plate at the other, which sleeve is placed around a portion of said shaft in such a manner that said teeth are supported in one of said fixed cones and said backing plate registers with said separating means; and a helical spring included around the shaft, which helical spring has one of its ends supported against the other of the fixed cones and the other of its ends bears against the separating means.

3,993,179

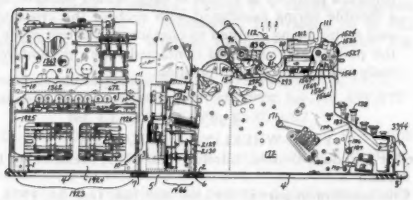
JUSTIFYING, TEXT WRITING COMPOSING MACHINE

William S. Gubelmann, deceased, late of Convent, N.J., by Walter S. Gubelmann, executor, Oyster Bay, N.Y., and William R. Grier, New Vernon, N.J., assignors to Realty & Industrial Corporation, Morristown, N.J.

Filed Dec. 28, 1971, Ser. No. 213,045

Int. Cl.² B41J *5/30*

U.S. Cl. 197—19 **116 Claims**



1. A justifying, text writing composing apparatus, wherein information for a justified reproduction is automatically encoded on a code medium in response to the typing and completing of a line of text, comprising composing means including function operation means and character operation means as well as coding means, a first connecting means operatively interposed between said function and character operation means and said coding means for encoding the text and function information representing the actuation of said function and character operation means, said coding means comprising a first encoder for encoding the text and function information on said code medium and a justifying encoder for encoding justifying information in said code medium, means for advancing said code medium through said coding means, said justifying encoder being located downstream of said first encoder relative to the advance direction of said code medium, a pre-settable right margin means, first counting means for simultaneously and decreasingly counting the number of unit lengths remaining in a line as the line of text extends into a predetermined length justifying area ahead of a right margin controlled by the set position of the right margin means during composition of the line, second counting means for counting the number of word space functions in a line of text, and dividing means as well as means for connecting the dividing means to said first and second counting means for controlling said dividing means to produce justifying information, and a second connecting means for connecting said dividing means to said justifying encoder for encoding said justifying information on said code medium ahead of said text and function information.

3,993,180

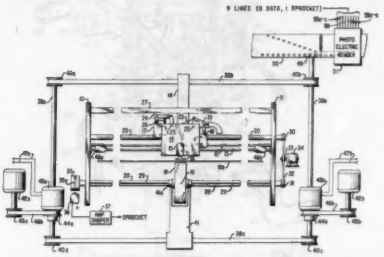
DRIVE MECHANISM FOR AN ASYNCHRONOUS PRINTER

Robert A. Locke, Lansdale, Pa., assignor to Sperry Rand Corporation, New York, N.Y.

Continuation of Ser. No. 436,667, Jan. 25, 1974, abandoned. This application Aug. 7, 1975, Ser. No. 602,728

Int. Cl.² B41J *1/32*

U.S. Cl. 197—49 **8 Claims**



1. A printer mechanism for printing symbols along a print line on a print-receiving medium comprising:

a carriage means including a printing member having a series of type elements arranged thereon and a print actuating means for causing contact with said print-receiving medium along said print line;

motivating means for providing motivating energy;

printing drive linkage between said motivating means and said carriage means to drive the carriage means along a line parallel to said print line and to drive said printing member for positioning said type elements synchronously with movement of said carriage means along said print line, during a printing mode of operation when said print actuating means is selectively energized to print on said print-receiving medium, said printing drive linkage including a rotating lead screw and a pawl means mounted on said carriage means for engaging said lead screw during said printing mode of operation but for being disengaged from said lead screw during a tabulating mode of operation;

a separate tabulating drive linkage between said motivating means and said carriage means to drive said carriage in either direction along said line parallel to said print line during the tabulating mode of operation, said tabulating drive linkage including a clutch means for engaging to drive said carriage means asynchronously with movement of said printing member during the tabulating mode; and

a control unit for actuating said pawl means and said clutch means.

3,993,181

MATRIX PRINTER INCORPORATING INTERMITTENT INK RIBBON TRANSPORT

Theodorus Gerhardus Potma; Wilhelmus Adrianus Henricus Gijzen, and Johannes Gerhardus Pape, all of Rijswijk, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed June 12, 1975, Ser. No. 586,351

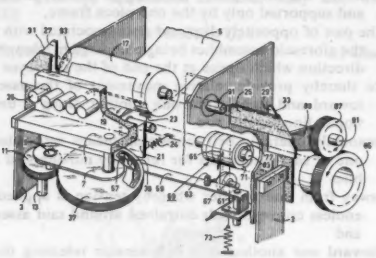
Claims priority, application Netherlands, June 21, 1974, 7408352

Int. Cl.² B41J *35/14, 35/18*

U.S. Cl. 197—167 **6 Claims**

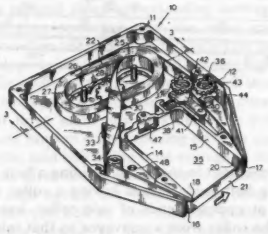
1. A matrix printer for cooperation with an associated record carrier which comprises: a record carrier transport for moving the record carrier in one direction, a printing head which is movable along the record carrier in a direction transverse to said one direction of the record carrier and which includes a number of straight, mutually parallel recording pins for printing characters which are composed of matrix points,

an ink ribbon which is arranged parallel to the printing line direction, a plurality of electromagnets carried by said head, one end of each of said recording pins being connected to the armature of one of said electromagnets, each of said recording pins being in one line substantially parallel to the printing line direction, a ribbon transport device including means for the



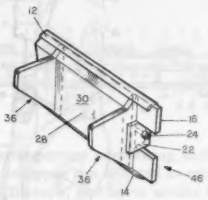
intermittent movement of the ink ribbon parallel to the movement direction of the record carrier, said ribbon transport device including a unidirectional coupling comprising a bidirectional means and a unidirectional means, said bidirectional means driving said ribbon in said one direction and opposite said one direction and said unidirectional means driving said record carrier in said one direction.

3,993,182
ENDLESS INKED RIBBON CARTRIDGE
James Marion Steinke, Longwood, Fla., assignor to TRW Inc., Los Angeles, Calif.
Filed Oct. 14, 1975, Ser. No. 622,223
Int. Cl.² B41J *33/10*
U.S. Cl. 197—168 **10 Claims**



1. An endless printer ribbon cartridge comprising in combination:
- a housing having a pair of protruding arms;
- a pair of spaced rollers rotatably attached to said housing;
- an endless inked ribbon partially wrapped around said pair of spaced rollers for a plurality of turns so as to leave an open space between said rollers, said ribbon having a predetermined path coming off one roller between said pair of spaced rollers and being fed over said predetermined path back onto said partially wrapped portion of said ribbon;
- drive means located in said housing for driving said ribbon over said predetermined path;
- a gear portion attached to said spaced rollers and an idler gear rotatably attached to said housing between said rollers and operatively engaging each said gear portion of each roller whereby said rollers are synchronized; and
- said housing having a cavity extending into the bottom thereof with said rotatable idler gear rotatably attached therein and having the gear portion of said spaced rollers rotatably attached in said cavity.

3,993,183
LEHR LOADING BAR
Edward J. Stengle, Jr., Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio
Filed Jan. 29, 1976, Ser. No. 653,333
Int. Cl.² B65G *47/08*
U.S. Cl. 198—429 **6 Claims**

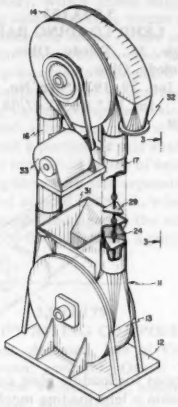


1. In an apparatus for loading glass containers into an annealing lehr wherein a lehr loading mechanism moves a lehr loading bar in a repeating cycle to bring said lehr loading bar into contact with a single file row of said glass containers and push them toward said lehr, an improved lehr loading bar which comprises, in combination:
- a main member substantially equal in length to the distance defined by the length of the single file row of said glass containers to be moved toward said lehr at one time;
- a first angled flange attached to one edge of said main member along the length thereof and inclined toward the centerline of said main member;
- a second angled flange attached to the opposite edge of said main member from said first angled flange and inclined toward the centerline of said main member on the same side thereof as said first angled flange;
- a plurality of liner bars in engagement with said first and second angled flanges, each of said liner bars having a front face extending beyond said angled flanges toward said glass containers, said liner bars' front faces each being equal in length to slightly more than one diameter of said glass containers;
- a plurality of spacers in engagement with said first and second angled flanges, said spacers and said liner bars being arranged in a repeating alternating pattern, said spacers extending further toward said glass containers than said front face to thereby define pockets for said glass containers between adjacent spacers separated by liner bars, the center to center spacing of adjacent spacers being slightly more than one glass container diameter; and
- means for locking said liner bars and spacers into said flanges.

3,993,184
CABLE CONVEYOR
David R. Campbell, Salt Lake City, Utah, assignor to Cambelt International Corporation, Salt Lake City, Utah
Continuation of Ser. No. 436,077, Jan. 24, 1974, abandoned.
This application May 22, 1975, Ser. No. 579,774
Int. Cl.² B65G *47/18, 19/16*
U.S. Cl. 198—533 **9 Claims**

8. A method for transporting particulate material through a conduit, comprising the steps of:
- introducing particulate material into a feed housing communicating with one end of an enclosed conduit;
- passing cable means having spaced-apart flights attached thereto through said feed housing and said conduit at sufficient linear speed to mechanically agitate and accellerate the particulate material as the particulate material

is transported from the feed housing through the conduit by said cable means and flights; and



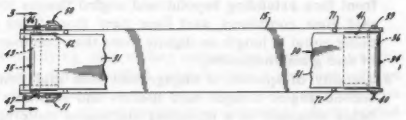
receiving the agitated material at the opposite end of of said enclosed conduit in a discharge housing with rotational blade means engaging the agitated material passing from said conduit and throwing it from an outlet in said discharge housing.

3,993,185

SANITARY CONVEYOR

Robert C. Fleckenstein, 313 N. Garfield St., and Kirit S. Kamdar, 1301 S. Finley St., both of Lombard, Ill. 60148

Filed Dec. 26, 1974, Ser. No. 536,341
Int. Cl.² B65G *21/00*
U.S. Cl. 198—813 **3 Claims**



1. A unitary, one piece frame sanitary conveyor, said sanitary conveyor including, in combination,

a one piece frame, said frame having

a horizontal belt bed,

said belt bed having a smooth, continuous upper surface for supporting a tensioned conveyor belt which slides thereover,

a side member formed integrally with, and depending downwardly from, each edge portion of the belt bed member,

said belt bed member and downwardly depending side members being formed as a single part having a smooth, continuous surface,

an idler assembly having a central supporting shaft, the end portions of which project outwardly from each end of the idler assembly,

a pair of shaft receiving slots disposed opposite one another in the side members at a tail end portion of the conveyor,

said end portions which project outwardly from the central supporting shaft of the idler assembly being received in said oppositely disposed slots,

whereby the idler assembly is directly attached to and supported only by the one piece frame,

a drive pulley assembly having a central supporting shaft, the end portions of which shaft project outwardly from each end of the drive pulley assembly,

a pair of drive pulley assembly shaft receiving slots disposed opposite one another in the side members at a head end portion of the conveyor,

said central supporting shaft end portions being received in said oppositely disposed drive pulley assembly shaft receiving slots,

whereby the drive pulley assembly ic directly attached to and supported only by the one piece frame,

the pair of oppositely disposed slots associated with one of the aforesaid assemblies being elongated in a longitudinal direction which opens at the end of the conveyor bed,

to thereby provide relative movement of the assemblies toward and away from one another along a unidirectional, linear path, and

manually operable belt tensioning means associated with one of said assemblies for relatively moving said assemblies

away from one another whereby tension is applied to an endless conveyor belt entrained around said assemblies, and

toward one another in a belt tension releasing direction which is parallel to the direction of movement of the conveyor belt, and within the confines of the slots,

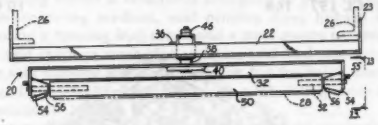
whereby a belt entrained about the conveyor belt bed and said assemblies can be lifted out of contact with the conveyor structure for cleaning without concomitant movement of conveyor components in a direction having a vertical component of movement.

3,993,186

MEANS FOR GUIDING A CONVEYOR BELT

Paul R. Sokolowski, 6888 Vernmoor, Troy, Mich. 48084

Filed July 30, 1975, Ser. No. 600,134
Int. Cl.² B65G *15/64*
U.S. Cl. 198—806 **1 Claim**



1. Improvement in means for guiding a belt on a conveyor comprising belt guide means having a roller and belt guide members at opposite ends of said roller, hanger means for hanging the roller from a conveyor so that said roller pushes upon the slack side of said conveyor belt, means providing a pivot axis by which said roller can rotate in respect to said hanger means during operation of said conveyor, said device utilizing the left or right sideways movement of said belt to engage one of said guide members and rotate said roller about said pivot axis so that said belt is automatically moved by said device toward the position from which it originally commenced to move, said improvement comprising a roller frame for said roller, an axle made fast to said roller frame, said roller rotatably carried on said axle, said belt guide members carried on said axle and made fast to said roller frame, said belt guide members having belt-contacting surfaces for engaging opposite edges of said belt, each said belt-contacting surface disposed at an obtuse angle to said axle, said hanger means comprising a hanger frame constructed for attachment to the frame of said conveyor, said means providing a pivot axis comprising a pivot shaft carried in said hanger frame, a pair of thrust bearings for said pivot shaft and means for holding said thrust bearings in place in said hanger frame at opposite ends of said pivot shaft, whereby during operation of said device said roller rotates freely in spite of the belt pressure thereon.

3,993,187

METHOD AND APPARATUS FOR TURNING STACKABLE CUPS TO A STACKING POSITION

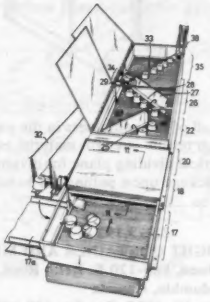
Jordan Knez, Halmstad, Sweden, assignor to Duni Bila AB, Halmstad, Sweden

Filed May 14, 1975, Ser. No. 577,227

Claims priority, application Sweden, May 28, 1974, 7407033

Int. Cl.² B65G 47/24

U.S. Cl. 198—382 21 Claims



1. An apparatus for turning and stacking a plurality of cups each having a tapered side wall extending between a closed bottom end and an open top end, the open end being of greater diameter than the closed end to facilitate stacking, the height of the cups being less than said greater diameter, said apparatus being characterized by comprising a conveyor belt for receiving the cups in a first zone where the cups arbitrarily assume one of three main positions upon the belt, namely: reposing on their bottom ends, reposing on their open ends or lying on one side; said belt being wide enough in the direction transverse to the direction of movement of the belt to support a plurality of cups across the width of the belt; means for moving the conveyor belt so that the belt passes through a zone downstream relative to said first zone provided with resilient lifting means extending across the width of the belt and having their free ends extending generally downward and toward the belt and arranged a spaced distance above the belt, said distance being less than said greater diameter and greater than said height so as to act only on those cups lying on their sides and to preferably erect those cups to a position of repose on their open ends, while the cups reposing on either their bottom or open ends pass freely through the second zone without engaging the lifting means; the belt being moved through a zone downstream relataive to the zone containing said lifting means provided with first moving tipping means which are arranged transverse to the movement of the belt to tip the cups from a position where they repose on their bottom ends to a position where they repose on their open ends, said first tipping means further including a guiding edge for slidably engaging only those cups reposing on their open ends to prevent the tipping means from engaging cups reposing on their open ends; and guiding means arraanged after said zones for leading the cups to a rejecting apparatus arranged above the conveyor belt which is adapted to remove all cups from the conveyor belt which assume a position other than having their open ends reposing on the conveyor belt.

3,993,188

TRANSPORTING ARRANGEMENT

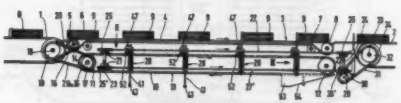
Hans Müller, Zofingen, Switzerland, assignor to Grapha-Holding AG, Hergiswil, Switzerland

Filed Feb. 2, 1976, Ser. No. 654,174

Claims priority, application Switzerland, Feb. 3, 1975, 1250/75

Int. Cl.² B65G 47/26

U.S. Cl. 198—461 7 Claims



1. A transporting arrangement comprising endless transporting means having an upper run adapted to receive products to be transported thereon; first drive means for driving said endless transporting means at a predetermined speed; placement means upstream of said endless transporting means for placing products in timed sequence on one end of said upper run so that such products are transported spaced from each other by said upper run; a first endless chain having a run parallel to said upper run of said endless transporting means and being connected to said first drive means to be driven thereby at a speed equal to said predetermined speed; a plurality of actuating means fixed equally spaced from each other to said first endless chain and arranged in such a manner that the actuating means on said one of said first chain are respectively located intermediate successive products on said upper run; at least one second endless chain having a run parallel to said upper run and a return run; a plurality of entrainment means connected to said second chain equally spaced from each other and each movable between a rest and a working position in which said entrainment means respectively project into the path at which said products are transported by said endless transporting means; second drive means for driving said second chain at a speed greater than said predetermined speed so that said entrainment means on said second chain overtakes said actuating means on said first chain; means on each of said entrainment means for moving the latter from said rest to said working position when an entrainment means overtakes an actuating means on said run of said first chain; and means cooperating with said entrainment means for moving the latter from said working to said rest position in the region of said return run of said second chain.

3,993,189

PROCESSING CONVEYOR

Rouzas R. Khoylian, Belmont; Hans G. Haimberger, Pinehurst, and James R. Cowdery, Andover, all of Mass., assignors to Design & Process Engineering, Inc., Burlington, Mass.

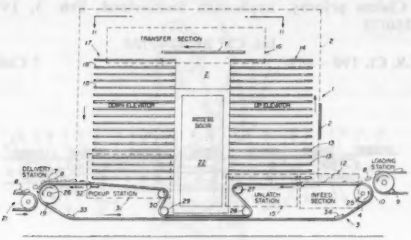
Filed May 8, 1975, Ser. No. 576,013

Int. Cl.² B65G 37/00

U.S. Cl. 198—465 8 Claims

3. A conveying system for continuously transporting articles from a loading station through a processing environment to an unloading station, comprising a conveyor; an up elevator; a down elevator; first carrier exchange means; second carrier exchange means; third carrier exchange means; a series of flexible carrier mats each comprising means adapted to support a group of articles to be processed; and means for driving said conveyor, said up elevator, and said down elevator in synchronism; in which said conveyor comprises means for transporting said mats in sequence from a first point in advance to said unloading station to a second point following said loading station; said up elevator comprises means for moving said mats upwardly, said down elevator comprises means for moving said mats downwardly; said first carrier exchange means comprises means responsive to the arrival of

each of said mats supporting on said conveyor at said second point for transferring that mat to a first of said up and down elevators; said second carrier exchange means comprises means responsive to the arrival of each of said mats on said



first elevator at a predetermined distance from said conveyor for transferring that mat to the second of said elevators; and said third carrier exchange means comprises means effective when a mat approaches said conveyor on said second elevator for transferring that mat to said conveyor.

3,993,190

APPARATUS FOR PACKAGING AND DISPENSING A STAIN REMOVING AGENT IN PORTIONS

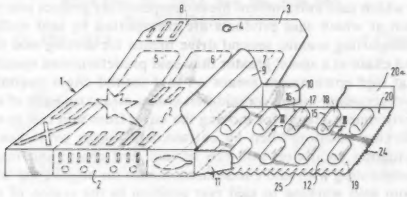
Heinz Schmidgall, Teufen, Switzerland, assignor to Chemiro AG, Saint Gall, Switzerland

Filed June 19, 1975, Ser. No. 588,145

Claims priority, application Germany, June 24, 1974, 2430146

Int. Cl.² B65D *69/00*; **B43K** *5/14*

U.S. Cl. 206—229 **14 Claims**



1. An apparatus for packaging in portions a stain removing agent, said packaging apparatus comprising: capsules for containing stain removing agent; said capsules being made of a material which can be deformed by the action of pressure; a receiving plate including receiving troughs for individually receiving said capsules, said receiving plate including integral scraper means at one edge thereof for permitting scraping of an area after application of said stain removing agent, said integral scraping means comprising said plate including corrugations along an edge thereof to thereby define said scraper means; a covering sheet extending over said receiving plate and covering said capsules.

3,993,191

DIVIDABLE TRANSPORT PALLET AND PACKAGE

John N. Membrino, Berwyn, Pa., assignor to Scott Paper Company, Philadelphia, Pa.

Filed Apr. 7, 1975, Ser. No. 565,819

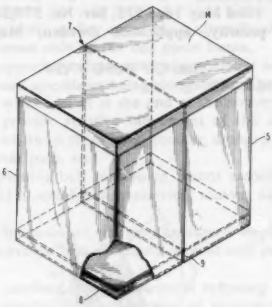
Int. Cl.² B65D *19/06*, *5/54*, *17/20*

U.S. Cl. 206—386 **10 Claims**

1. A dividable transport package comprising:

A. at least two containers in side-by-side relationship on opposite sides of a vertical dividing plane; and

B. a single pallet upon which both containers are secured to form the bottom of the package, the pallet comprising a continuous-plane platform of low tear strength material



which supports all of the containers in the package and a thin band of high tensile strength material encircling the pallet in the vertical dividing plane for dividing the pallet into separate package upon pulling the band.

3,993,192

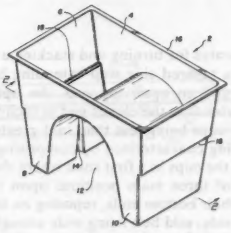
PIPELINE WEIGHT CONTAINER AND METHOD

Christopher Brian Bunn, 503-120 E. Keith Road, North Vancouver, British Columbia, Canada

Filed Nov. 10, 1975, Ser. No. 630,495

Int. Cl.² B65D *21/00*, *21/02*; **F16L** *9/00*, *1/00*

U.S. Cl. 206—515 **11 Claims**



1. A pipeline weight container comprising a self-supporting container comprising:

a hollow body having an open top;

hollow legs extending from the body, away from the open top, and spaced and shaped (a) to be locatable and a close fit over a pipeline of predetermined diameter and (b) to be stackable with two other similar units, one inside the container and the other outside.

3,993,193

DOCUMENT SORTING SYSTEM

Rolland Welch, Fairfax; Robert Springer, Woodbridge; Brian Mayberry, Alexandria, all of Va., and Robert Sheppard, Poolesville, Md., assignors to Optical Recognition Systems, Inc., Reston, Va.

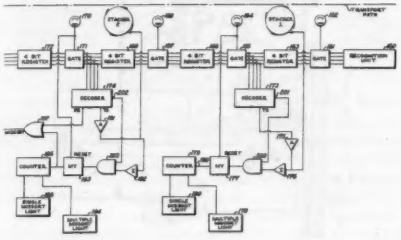
Division of Ser. No. 355,633, April 30, 1973, Pat. No. 3,874,653. This application Jan. 16, 1975, Ser. No. 541,681

Int. Cl.² B07C *5/00*

U.S. Cl. 209—74 M **4 Claims**

1. A document sorting system for sorting documents conveyed along a transport path into selected ones of a plurality of activatable document receiving means located along said transport path, each of said document receiving means having

a predetermined code associated therewith and having to be conditioned by an activation signal to properly receive said documents, comprising, means responsive to information disposed on or in a document for generating a code signal indicative of the receiving means into which said document is to be sorted, a plurality of transducer means located along said transport path, each transducer means being effective to cause a leading edge signal to be generated when the leading edge of a document passes said transducer means, a code signal storage means associated with each transducer means and responsive to said leading edge signal for storing the code signal associated with the document causing the signal to be generated, a decoder means associated with each document receiving means and responsive to the code signal outputs of the code signal storage means associated with the transducer means preceding the document receiving means with which the decoder means is associated for generating an activation



signal for said document receiving means when said code signal outputs correspond to the code associated with said document receiving means, means associated with each decoder means for generating a conditiion signal when code signals are inputted to the decoder means but when the decoder means does not generate said activation signal, and means responsive to said condition signal for generating a missort indication if the leading edge of a document does not interrupt the transducer means following the receiving means with which said decoder means is associated within a predetermined time said means for generating a missort indication including a delay means, said delay means including a resettable multi-vibrator means triggered by said conditon signal for generating a signal causing said missort indication if said multi-vibrator means is not reset within said predetermined time from the occurrence of said condition signal, a signal caused to be generated by said following transducer means being effective to reset said multi-vibrator means.

3,993,194

METHOD AND APPARATUS FOR MONITORING THE DENSITY OF ROD-SHAPED ARTICLES, PARTICULARLY CIGARETTES AND THE LIKE

Joachim Reuland, Hamburg, Germany, assignor to Hauni-Werke Korber & Co., KG, Hamburg, Germany

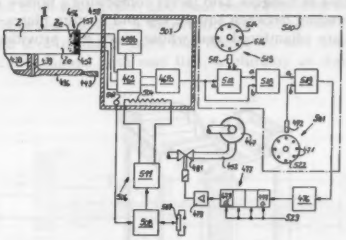
Continuation-in-part of Ser. No. 499,900, Aug. 23, 1974. This application June 5, 1975, Ser. No. 583,965

Claims priority, application Germany, Aug. 30, 1973, 2343668; Dec. 20, 1973, 2363365

Int. Cl.² B07C *5/08*

U.S. Cl. 209—81 R **49 Claims**

1. A method of monitoring the density of rod-shaped articles, particularly cigarettes, cigars, cigarillos, other smokers' products and parts thereof, comprising, in combination, the step of passing through at least one portion of at least one such article the electric field lines of a high-frequency electric field joining the electrodes of a capacitor, and generating a density-dependent measurement signal by detecting the effect upon the capacitance of the capacitor of the passage of the field lines through the article; the step of passing through a reference dielectric medium the electric field lines of a high-frequency electric field joining the electrodes of a capacitor, and generating a comparison signal by detecting the effect of the reference dielectric medium upon the capacitance of the



capacitor; and the step of combining said measurement signal and said comparison signal to form a compensated density-dependent signal.

3,993,195

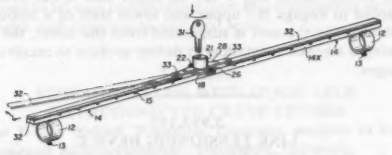
LOCKABLE GARMENT DISPLAY RACK

Joseph M. Caligiuri, 37 Kennedy Place, Tuckahoe, N.Y. 10707

Filed Dec. 29, 1975, Ser. No. 644,520

Int. Cl.² E05B *73/00*

U.S. Cl. 211—7 **5 Claims**



1. A lockable device for garment hangers comprising a U-shaped Channel bar having a top wall and parallel side walls, said top wall having at least one substantially pear-shaped lock aperture at the end thereof, said aperture having a circular aperture portion continuous with a parallel edge slot aperture portion adapted to lockingly engage a lock flange; a key assembly, having a rotatable element within a barrel actuated by a key rotation of 180°, said element having a cam pin for engagement with a cam slot, and having further a grooved plate fixedly secured to said barrel with the groove thereunder, and having further a slide bar disposed slidably in said groove and with said cam slot therein to engage said cam pin; at least one arm hingedly secured to an end of said slide bar, said arm having at its end a depending flanged lock pin, whereby swinging of said arm over the top wall of said channel bar with the flanged hinge pin over the circular portion of said pear-shaped aperture permits the depression of said pin into the circular portion and the turning of said key barrel effects a movement of the slide bar and the arm to force the flange of said lock pin into locking relationship into the slot portion of said aperture.

3,993,196

TURRET FOR SUPPORTING BOX-DISPENSING UNITS

Vincent J. Immordino, Flushing, N.Y., assignor to Display Originals, Inc., West Babylon, N.Y.

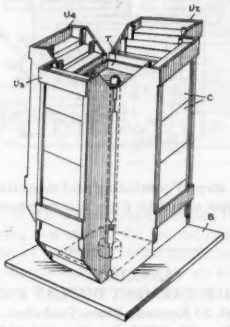
Filed Aug. 28, 1975, Ser. No. 608,693

Int. Cl.² A47F *5/02*

U.S. Cl. 211—49 D **3 Claims**

1. A display turret for supporting four identical box dispensing units on a counter in a cruciform array, each unit being constituted by a frame having a pair of parallel side walls from which ledges project inwardly to divide the frame interior into

compartments for accommodating the boxes to be dispensed, the side walls being bridged at the front of the frame by cross-pieces, the side walls being bridged at the rear of the frame by upper and lower cross slats having a predetermined length and functioning as hangers, said turret comprising a hollow center post extending between square top and bottom plates whose corners are chamfered and whose sides are provided with



upwardly-extending flanges of a length slightly shorter than said predetermined length to define brackets whereby each side of the turret has a set of upper and lower brackets adapted to engage the upper and lower slats of a respective unit whereby the unit is suspended from the turret, the slats having a stepped formation to define sockets to receive said flanges.

3,993,197

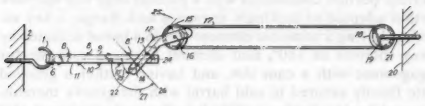
LINE TENSIONING DEVICE

Walter Tann, 60-68 69th Ave., Ridgewood, N.Y. 11227

Filed Jan. 15, 1976, Ser. No. 649,486

Int. Cl.² D06F *53/00*

U.S. Cl. 211—119.09 **18 Claims**



1. A line tensioning device comprising a beam, first and second rows of uniformly spaced cams, said cams within said first and second rows being disposed in a plane parallel to the longitudinal axis of said beam, said first and second rows of cams being disposed in spaced apart relationship, biasing means for urgingly extending a portion of each of said cams outwardly from said longitudinal axis, said outwardly extending portion of each of said cams in said first row extending in a direction opposite from said outwardly extending portion of each of said cams in said second row, beam securing means for fastening one end of said beam to a supporting structure, an arm having a pair of distantly spaced pins fixedly secured thereto, said pins being capable of engaging said portions of adjacent cams in said first and said second rows, line securing means for securing a portion of a line to said arm, said outwardly extending portions of said cams preventing said pins from longitudinal displacement towards the other end of said beam upon engagement of said pins with said outwardly extending portions, and means for overcoming said biasing means capable of displacing said outwardly extending portions inwardly for preventing engagement of said pins with said outwardly extending portions of said cams.

3,993,198

TELESCOPIC COLUMN CRANE FOR STORES IN PARTICULAR FOR CARGO HOLDS

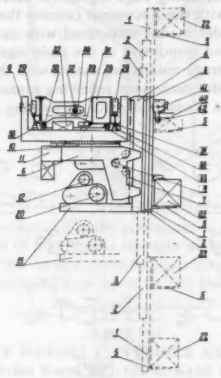
Mieczyslaw Hann, Szczecin, Poland, assignor to Politechnika Szczecinska, Szczecin, Poland

Filed Apr. 3, 1975, Ser. No. 564,724

Claims priority, application Poland, Apr. 3, 1974, 170059

Int. Cl.² B66C *19/00*

U.S. Cl. 212—127 **4 Claims**



1. A telescopic column crane for stores, in particular for cargo holds, consisting of a bridge built of a main box girder and an auxiliary single-web girder with said crane mounted for movement on said bridge and comprising a crab with a rotary platform and a telescopic column with a clamp, characterized in that the said telescopic column has a mobile system of distal, medial and proximate members respectively, slidable below or above a fixed member connected slidably with the rotary platform of the crane crab in order that the fixed member may be lowered together with the mobile members to a level permitting the turning of the platform, said distal member being provided with a fork and a movable member forming a clamp means, said clamp means being slidable along this distal member by means of a tie system of guiding, said system of guiding consisting of a winch connected with the fixed member and of lifting and lowering ties wound through all members of the column.

3,993,199

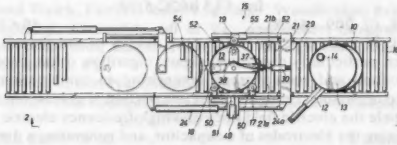
FILLER-FITTING ALIGNMENT APPARATUS

Henry A. Jorgensen, Freeport; Robert H. Reeves, Jr., Lake Jackson; Harry Louis Kennedy, and Prakash Kesaree, both of Freeport, all of Tex., assignors to Velasco Scale Company, Inc., Freeport, Tex.

Filed May 5, 1975, Ser. No. 574,415

Int. Cl.² B65J *3/00*

U.S. Cl. 214—1 R **8 Claims**



1. An automated filler-fitting alignment apparatus for locating and positioning a filler-fitting of a fluid container, comprising:

a main arm pivotally mounted on a support structure adjacent a container receiving station; and

a swing arm affixed at a first end to said main arm, said swing arm having,

an eccentric locator cone rotatably mounted on said swing arm at a point spaced apart from the first end of said swing arm, and

said eccentric locator cone having a roller mount at the lower end of said cone, said roller mount having a guide roller mounted thereto said guide roller for locating a filler-fitting in the upper surface of said fluid container.

3,993,200

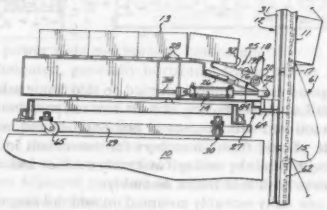
CARGO TRANSPORT SYSTEM

Allan R. Ide, 10066 Bloomfield, Cypress, Calif. 90630

Filed Dec. 24, 1975, Ser. No. 644,344

Int. Cl.² B65G *67/58*

U.S. Cl. 214—14 **12 Claims**



1. A cargo transport system for transferring discrete cargo loads between a movable vessel and a stationary cargo terminal and comprising:

a vertically extending conveyor tower mounted on said cargo terminal;

an endless conveyor means formed with discrete receptacles transversing the length of said tower, so each of said receptacles sequentially approaches said vessel to receive a cargo load therefrom;

lateral conveyor means positioned on said vessel for directing movement of said discrete cargo loads along a path terminating at said conveyor tower;

transfer means positioned between said tower and said lateral conveyor means for transferring cargo loads between said receptacles and said lateral conveyor means; and

receptacle sensing means for detecting an approaching receptacle and for actuating said transfer means to effect the transfer of a cargo load as between said approaching receptacle and said lateral conveyor means whereby said cargo loads are automatically moved along said lateral conveyor to be sequentially loaded in said receptacles for conveyance along said tower.

3,993,201

APPARATUS FOR TRANSPORTING AND STORING HEAVY COMMODITIES

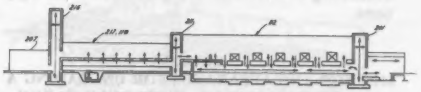
Heinrich Bauer; Karl-Heinz Dörner, both of Grevenbroich; Helmut Eberlin, Wyhlen; Hans Kaulen, Grevenbroich; Werner Pazurek, Grenzach-Horn; Heinz Richarz, Grevenbroich; Harro J. Taubmann, Rheinfelden, and Gerhard Wolf, Grevenbroich-Neuenhausen, all of Germany, assignors to Eisenbau Wyhlen AG, Wyhlen and Vaw Leichtmetall GmbH, Bonn, both of Germany

Filed Sept. 20, 1973, Ser. No. 399,182

Int. Cl.² B23P *17/00*

U.S. Cl. 214—16.4 A **4 Claims**

1. Apparatus for manipulating heavy commodities, especially convoluted band stock or the like in a plant wherein said commodities are treated at several stations of at least one production line having a receiving end and a discharge end and being located at a first level, comprising first and second magazines respectively provided at the receiving and discharge ends of the production line; a floor located at said first level on which said several stations are located along a line spaced from each other, said floor being provided with openings between stations; a tunnel located below said floor at a second level different from said first level, said tunnel being vertically aligned with said line; a plurality of transporting



devices to transport the commodities between said magazines and to and from said stations with said transporting devices and said commodities thereon as they are transported between said stations arranged in said tunnel at said second level different from said first level; and means on each of said transporting devices for transferring the commodities thereon from said second to said first level, whereby said transferring means may be used to lift said commodities from said transporting devices through said openings to said first level.

3,993,202

STORAGE SYSTEM WITH ADJUSTABLE INTERCONNECTED CRANE TOWERS

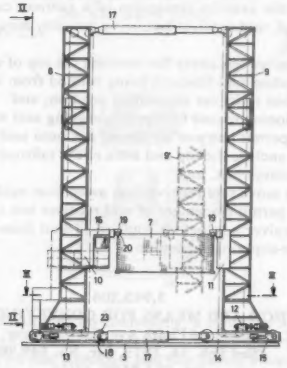
Hans Walter Neitzel, Weinheim, Germany, assignor to Mannesmann Aktiengesellschaft, Dusseldorf, Germany

Filed July 26, 1975, Ser. No. 598,763

Claims priority, application Germany, Aug. 2, 1974, 2437208

Int. Cl.² B65G *1/06*

U.S. Cl. 214—16.4 A **5 Claims**



1. Storage facility for containers having at least two frames for shelves and spaced apart to define an access space, in which moves a loading crane, the improvement comprising:

the space between the two frames for shelves being only slightly larger than the width of a container;

the crane having two interconnected units, each unit comprising a tower, a motor-driven carriage respectively for

the tower, the carriages of the towers provided for moving the towers in unison along and in said space as well as towards and away from each other, each unit further having a motor-driven elevator on and moving vertically along the respective tower of the unit;

carrying and loading arms respectively on the elevators for uniform lateral extension into the shelves and provided with means for connection to and suspension of a container between the elevators of the towers; and

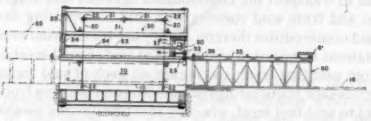
at least one upper and one lower connection between the towers each comprised of a pair of elements, distance adjustable to each other, and means for releasably interconnecting the elements in predetermined locking positions.

3,993,203

METHOD AND APPARATUS FOR UNLOADING A RAILROAD CAR CONTAINING BULK CARGO

Thomas S. Bartley, Mobile, Ala., assignor to International Paper Company, New York, N.Y.

Filed Nov. 7, 1975, Ser. No. 629,993
Int. Cl.² B65G 67/34
U.S. Cl. 214—45 **14 Claims**



1. A railroad car unloading apparatus comprising:

a. a rotatably mounted frame having railroad track mounted thereon for supporting a railroad car containing bulk cargo;

b. a drive means for rotating said frame from a car supporting position at least about 180° about the longitudinal axis of said frame to a discharge position to thereby discharge by gravity bulk cargo from a railroad car on the track;

c. clamping means mounted on said frame for holding said railroad car on said track during rotation of said frame and said railroad car;

d. a receiver box for receiving bulk cargo from the railroad car, said receiver box having interior dimensions greater than the exterior dimension of a railroad car to be unloaded, said receiver box being movably mounted on said frame;

e. a receiver box cover for covering the top of said receiver box when said frame is being rotated from its discharge position to its car supporting position; and

f. positioning means for cyclicly moving said receiver box

i. to permit entry of a railroad car onto said frame,

ii. to enclose the top and sides of the railroad car with the receiver box, and

iii. to move said receiver box away from said railroad car to permit placement of said receiver box cover on said receiver box before rotation of said frame back to its car-supporting position.

3,993,204

METHOD AND MEANS FOR CONVEYING ITEMS

Francis F. Hummel, 1612 4th Ave. East, Spencer, Iowa 53101

Filed Feb. 14, 1975, Ser. No. 549,908
Int. Cl.² B65G 47/36
U.S. Cl. 214—89 **15 Claims**

1. An extensible conveyor comprising:

a support;

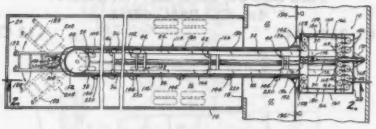
an extensible frame assembly having a first end mounted to said support and a distal end, said frame assembly comprising at least two elongated frame members movably mounted with respect to one another for extensible movement from a retracted to an extended position;

a continuous flexible conveyor loop member,

a loop mounting means on said frame assembly, said loop member being trained around said loop mounted means for movement about a continuous path commencing adjacent said first end of said frame assembly, thence adjacent said distal end, and thence returning to its original position adjacent said first end;

said loop mounting means having takeup means for taking up the slack in said loop member when said frame members are in said retracted position and for feeding out the slack in said loop member when said frame members are in their extended positions; and

power means for extending and retracting said frame assembly;



an elongated rail assembly mounted on said frame assembly, said rail assembly having at least two rail members movably mounted with respect to one another and mounted to one of said frame members for movement in unison therewith whereby said rail assembly extends and retracts in unison with said frame assembly;

at least one dolly movably mounted on said rail assembly for movement therealong, said rail assembly being shaped to follow a path adjacent the path of said loop member; and

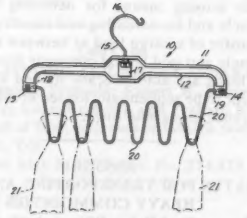
dog means on said loop member for engaging said dolly and moving said dolly along said rail whenever said loop member moves along its path.

3,993,205

PRE-TIED NECKTIE HANGER

Charles C. Pilchard, 225 S. Stine Road, Bakersfield, Calif. 93309

Filed Feb. 21, 1975, Ser. No. 551,729
Int. Cl.² A47F 7/12
U.S. Cl. 211—116 **3 Claims**

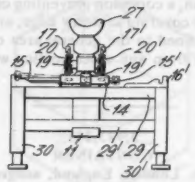


1. A pre-tied necktie holder comprising a horizontal member of two spaced apart parallel bars, blocks joining the ends of the two bars, a horizontal hole through the center of each block parallel with and below the spaced apart bars, a member pivotally suspended from the horizontal member by attachment to the bars with the outer ends of the member passing through the horizontal holes in the blocks, a plurality of upwardly opening vertically extending, narrowly tapering, uniform slots in the member, and a support attached to the center of the horizontal member.

3,993,206
POWER SLIDE MECHANISM

Katsumasa Jomen, and Keitaro Sunaga, both of Sagamihara, Japan, assignors to Mitsubishi Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 8, 1974, Ser. No. 522,289
Claims priority, application Japan, Feb. 8, 1974, 49-15405
Int. Cl.² E02F *5/02*; **F15B** *15/00*
U.S. Cl. 214—138 C **6 Claims**



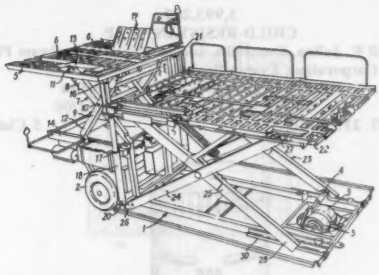
1. A power slide mechanism, comprising:
an elongated, generally horizontal frame having a left end and a right end;
latch means provided at each end of the elongated frame;
an equipment mounting frame mounted on the elongated frame for movement generally horizontally therealong parallel to the sense of elongation of the elongated frame from adjacent one end to adjacent the other end of the elongated frame;
a hydraulic cylinder having a piston slidably received therein and a piston rod extending from each end of the hydraulic cylinder, the aggregate length of the piston and two piston rods being less than the distance between the two latch means on the elongated frame;
generally horizontal, transversally extending pivot means pivotally mounting the hydraulic cylinder, generally horizontally on the equipment mounting frame parallel to the sense of elongation of the elongated frame, so that one piston rod thereof extends leftwards and the other extends rightwards;
cooperating latch means provided at the outer ends of the two piston rods, for latching with and unlatching from the respective latch means at the left and right ends of the elongated frame;
means for selectively applying hydraulic pressure to either side of the piston to relatively extend one piston rod and correspondingly retract the other piston rod, and vice versa; and
means for temporarily tilting the cylinder sufficiently from horizontal to disengage respective elongated piston rod end cooperating latch means from the respective frame end latch means.

3,993,207
CARGO LOADING VEHICLES

Rodney Vernon Jones, Rochford, England, assignor to Atel Products Limited, Southend-on-Sea, England

Filed Mar. 20, 1975, Ser. No. 560,194
Claims priority, application United Kingdom, Mar. 22, 1974, 12930/74
Int. Cl.² B60P *1/02*
U.S. Cl. 214—512 **6 Claims**

1. A cargo vehicle comprising a chassis, said chassis having a forward end and a rearward end, a low platform supported by said chassis, said platform having upper disposed platform surface means effective to accept loads of cargo, first groundengaging wheel means operatively connected to said chassis and effective for imparting driving motion to said chassis with respect to said ground, said first wheel means being situated as to be located generally at the forward end of said chassis and outside of said chassis, said first wheel means having the respective axes of rotation thereof fixed with respect to said chassis and non-steerable, second ground-engaging non-driving wheel means operatively connected to said chassis and effective for steerably controlling the direction of travel of said chassis, said second wheel means being situated as to be located generally at the rearward end and inside of said chassis and beneath said low platform, said second wheel means having an axis of steerable rotation passing generally through the middle of said chassis, said upper disposed platform sur-

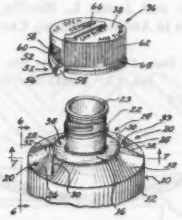


face means having an effective operating height when measured from the ground engaged by said wheel means as to be able to laterally accept loads of cargo having a lower surface situated at a distance in the order of approximately 20 inches above said ground, vehicle operator control means for both propelling said chassis by means of said first wheel means and steering said chassis by means of said second wheel means, said operator control means being carried generally at said forward end, and power operated means responsive to said control means for steerably rotating said second wheel means.

3,993,208
SAFETY CLOSURE MEANS

Efrem M. Ostrowsky, Highland Park, Ill., assignor to VCA Corporation, Baton Rough, La.

Filed Jan. 14, 1975, Ser. No. 541,015
Disclosure was also published under second Trial Voluntary Protest Program on Jan. 27, 1976
Int. Cl.² B65D *55/02*
U.S. Cl. 215—216 **12 Claims**



1. Safety closure means comprising, a container and a closure cap therefor, said container having a neck and a shoulder, a locking lug on said shoulder, said cap having a top end wall and a depending annular inner wall and a depending outer annular skirt spaced from said inner wall, said inner wall having means engaging the neck of the container to secure said cap to said container in a closed position, said outer skirt having a radially extending locking lug adjacent the lower end thereof, said cap locking lug adapted when the cap is rotated to cap closing position to pass inwardly of said container locking lug and to be compressed radially inward during said passage and as it moves past the container locking lug to be

released from its compressed state so that it extends outwardly beyond the engaging edge of said container locking lug to lock therewith and prevent counter-rotation of said cap, said outer skirt of said cap adapted to be manually engaged and pressed radially inward adjacent said cap locking lug to permit said cap lug to clear the engaging edge of the container lug and ride inwardly of the inside surface of said container lug when the cap is rotated in counter-rotation to permit removal of the cap from the container neck.

3,993,209

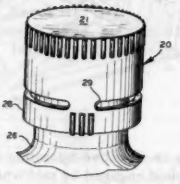
CHILD-RESISTANT CAP

Randall K. Julian, Evansville, Ind., assignor to Sunbeam Plastics Corporation, Evansville, Ind.

Filed Dec. 24, 1975, Ser. No. 644,134

Int. Cl.² B65D *55/02, 85/56;* **A61J** *1/00*

U.S. Cl. 215—216 **5 Claims**



1. A cap and neck finish for a container having a threaded neck,
   a. said cap having a disc-like top, an annular skirt and a depending collar at the lower margin of said skirt,
   b. two diametrically opposite flexible webs unitarally connecting said skirt and said collar,
   c. threads on the interior of said skirt mating with the threads on said container neck, and
   d. co-operating child-resistant locking means on opposite sides of the exterior of said container neck and on opposite sides of said collar that are engaged when said cap reaches sealed position on said container neck and are disengageable by inward flexure of opposite sides of said collar in a direction normal to a diameter extending between the child-resistant locking means on said collar.

3,993,210

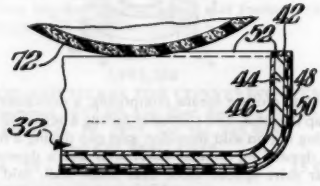
CONTAINER CLOSURE AND MANUFACTURE

Charles S. Ochs, and James L. Martin, both of Lancaster, Ohio, assignors to Anchor Hocking Corporation, Lancaster, Ohio

Filed Dec. 19, 1974, Ser. No. 534,658

Int. Cl.² B65D *45/30*

U.S. Cl. 215—274 **7 Claims**



1. A container closure comprising a plastic ring, said ring having a generally horizontal narrow rim and a depending skirt for engaging the finish on the neck of the container, said rim having a relatively wide central opening extending completely through said rim, said rim being disposed for being mounted above the upper edge of the container neck, a disc inserted within said ring beneath said rim, said disc being made of a stamped metal having a generally horizontal top wall and a generally vertical downwardly extending peripheral flange terminating in a raw edge extending completely around its periphery, said top wall of said disc being disposed against and under said rim of said ring and said disc top wall completely closing said central opening of said ring, said downwardly extending flange of said disc being disposed against said skirt of said ring, said raw edge of said disc being exposed, said metal of said disc including a metal layer which is readily subject to corrosion, a corrosion preventing coating applied to said raw edge and covering said raw edge, and said raw edge coating being confined to the general area of said raw edge and being distinct from any other coating which may be on said disc.

3,993,211

CONTAINER

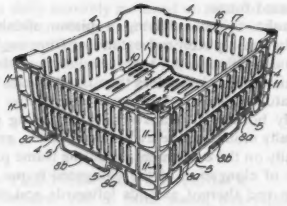
Miles Henry Astle, London, England, assignor to John Dale Limited, London, England

Filed June 24, 1975, Ser. No. 589,985

Claims priority, application United Kingdom, Jan. 1, 1975, 00813/75

Int. Cl.² B65D *7/32*

U.S. Cl. 220—1.5 **6 Claims**

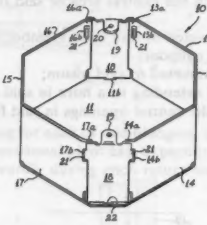


1. A container comprising a base having a generally level upper surface and a pair of substantially parallel downwardly facing channels extending from one side of the base to the opposite side, constituted by walls integral with said upper surface and projecting above the upper surface; and four similar side walls which are adapted for mounting perpendicular to the base along the sides thereof, the lower edge of each side wall including a pair of recesses of which the inner margins are spaced upwardly from the lower edge of the side wall, each recess being located and shaped for the accommodation of one end of one of said channels in the base so that when the side walls are mounted on the base, the ends of the channels are accommodated within the recesses in the lower edges of two opposed side walls, the recesses in the other two side walls being vacant, there being a continuous groove in each side wall along its lower edge and around the inner margins of the recesses therein and a continuous laterally projecting rim on the base which is shaped for engagement with the continuous grooves in the four side walls, the rim being disposed around the base so that it is raised above the upper surface of the base around the ends of the channels on the respective opposite sides of the base and at points on the other two sides of the base which correspond to the location of the vacant recesses in the said other two side walls, the groove in each side wall being deepened along at least a portion of the inner margin of each recess and along a portion of the lower edge of the side wall between the recesses, the respective parts of the rim on the base being correspondingly laterally extended for accommodation within the deepened portions of the grooves in the side walls.

3,993,212
ELECTRICAL OUTLET BOX

Allan F. Ryan, 26 Mason Road, R.R. No. 3, Masonville, Rawdon, Quebec, Canada J0K 1S0

Filed Aug. 5, 1974, Ser. No. 494,880
Claims priority, application Canada, Aug. 7, 1973, 178215
Int. Cl.² H02G 3/12
U.S. Cl. 220—3.6 6 Claims



1. An electrical outlet box, comprising:

a. a flat base having a polygonally shaped periphery determined by a plurality of straight edges disposed at an angle with respect to each other,

b. at least one rectangular side wall disposed perpendicular to the base plate and integrally joined thereto along a bottom side which is a fold line coincident with one of the base straight edges,

c. at least one second rectangular side wall perpendicular to the base and integrally connected to the first rectangular side wall along a side which is a fold line determining a common side between the first and second rectangular side walls,

d. the angular disposition between the first and the second rectangular side walls at the fold line being the same as the angle between the base fold line straight edge and the adjacent straight edge below the side wall, so that the adjacent side edges of the base and the second rectangular wall are in alignment and together form a corner of the outlet box,

e. a separate piece rectangular side wall which is disposed in a plane perpendicular with the base with its bottom edge engaging the base and adjacent and parallel to the corresponding base straight edge,

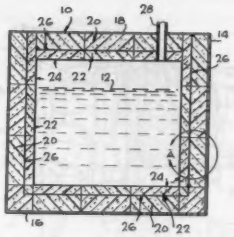
f. the separate piece rectangular side wall having its sides disposed adjacent to the free side of the second rectangular side wall, one of such sides including a tab projection, and the other side wall having an opening into which such tab fits, and the bottom edge and the base have interengaging means for holding the separate piece rectangular side wall in locked position such that is also supports the adjacent walls to which it is interengaged.

3,993,213
THERMALLY INSULATED CRYOGENIC CONTAINER

George W. Burge, Long Beach, and Richard A. Madsen, Torrance, both of Calif., assignors to McDonnell Douglas Corporation, Long Beach, Calif.

Filed Sept. 4, 1975, Ser. No. 610,125
Int. Cl.² B65D 25/18
U.S. Cl. 220—9 LG 19 Claims

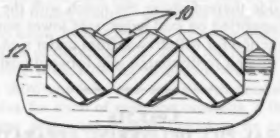
1. A thermally insulated container for low-temperature or cryogenic fluids, including liquid natural gas, which comprises an outer container having an outer wall, at least two layers of insulation material supported within said container, including an outer insulation layer and an inner insulation layer, an inner liquid liner disposed adjacent said inner layer, said liner being in contact with said low-temperature fluid, said inner insulation material being fluid permeable, and a stabilizing barrier of low fluid permeability disposed between said at least two layers of insulation material, said outer stabilizing barrier being positioned at a predetermined distance from the cold face of said inner liner, such that boiling of fluid permeating said inner insulation layer occurs therein adjacent said stabilizing barrier and forming a stable gas layer in said inner insulation layer adjacent said stabilizing barrier, thereby substantially preventing low-temperature liquid from contacting and penetrating said barrier, said predetermined distance being slightly larger than the penetration depth of a stable liquid film of said cryogenic fluid through said inner liner and into said inner insulation layer, said predetermined distance of said stabilizing barrier from the cold face of said inner liner being dependent upon the type of said low-temperature or cryogenic fluid, the head of said fluid in said container, the temperature of the outer wall of said container and the permeability of said stabilizing barrier.



3,993,214
OPEN LIQUID SURFACE COVER

Martin A. Usab, Santa Ana, Calif., assignor to Georg Fischer Aktiengesellschaft, Schaffhausen, Switzerland

Filed Aug. 25, 1975, Ser. No. 607,440
Int. Cl.² B65D 87/18
U.S. Cl. 220—218 20 Claims

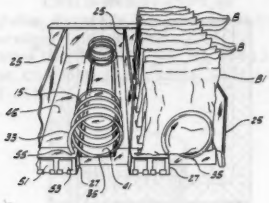


1. In combination, a tank containing liquid and a plurality of dodecahedrons floating on the surface of said liquid and substantially covering same, each of said dodecahedrons including twelve identical pentagonal faces, some of the edges of said dodecahedrons making contact with adjacent edges of adjacent dodecahedrons, others of the edges of said dodecahedrons making contact with adjacent surface of adjacent dodecahedrons, and some of the surfaces of said dodecahedrons making contact with adjacent surfaces of adjacent dodecahedrons.

3,993,215
SPIRAL VENDOR

Robert N. Cox, Bridgeton, and Kenneth G. Albers, Florissant, both of Mo., assignors to UMC Industries, Inc., New York, N.Y.

Filed Sept. 30, 1974, Ser. No. 510,281
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 9, 1976
Int. Cl.² G07F *11/46*
U.S. Cl. 221—75 **10 Claims**



1. In a vendor comprising a cabinet having a front door, at least one shelf in the cabinet, the forward end of the shelf being spaced rearward from the door to provide a drop space, a helix on the shelf extending in rear-to-front direction with respect to the cabinet and adapted to receive items to be vended between its convolutions, the items being wider than the diameter of the helix, the helix being interiorly unobstructed so that the items may be received between its convolutions extending across the helix from one side thereof to the other, the door having a window for viewing the forwardmost item, means for rotating the helix to advance the items toward the forward end of the shelf and discharge the forwardmost item off the forward end of the shelf to drop down in said drop space, and guides extending in rear-to-front direction on the shelf at opposite sides of the helix defining a path of travel for said items, the improvement comprising the provision of a formation for the forward end of the shelf including a notch at the forward end of the shelf and a forwardly projecting ledge at one side of the notch, the notch being open at the forward end of the shelf and extending rearwardly from the forward end of the shelf, and being offset toward one side of the path of travel of the items defined by said quides, the ledge being offset toward the other side of said path, the helix at its forward end extending over the notch and having an at-rest position wherein its forwardmost convolutions has a lower portion extending over the notch to support the forwardmost item at one side thereof above the notch with the other side of the item supported on said ledge, said lower portion rotating in the direction for withdrawal from under said item when said helix is rotated to discharge said forwardmost item.

3,993,216
PLURAL PILL DELIVERING APPARATUS

John E. Poole, Holland, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed Aug. 7, 1975, Ser. No. 602,848
Int. Cl.² B65H *3/08, 3/44*
U.S. Cl. 221—93 **4 Claims**

1. In apparatus for delivering pills to the interior of glass containers moving on a conveyor, including a pill feeder and a pair of magazines with the magazines extending from the feeder to the inlet end of a dispensing tube, and a gating device for selectively moving a predetermined number of pills into the inlet of the dispensing tube and isolating the magazines from the inlet, the improvement in said gating device comprising:

three plate-like members;

means mounting said members in facing relationship;

a first member formed with a central opening therethrough having a diameter substantially equal to the diameter of the pills and a length greater than the width of two pills;

a second member having a central opening formed therein, said second member having a pair of pill directing slots formed therein that converge at the central area thereof in alignment with the opening in the first member;

said magazines connected to said slots;

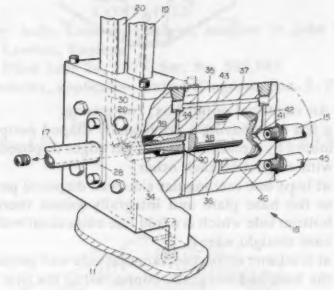
a third member having a central opening formed therein in alignment with the central area of said first and second members;

a cylinder connected to said third member;

a piston in said cylinder;

a piston rod connected to said piston;

said piston rod extending in a bore in said cylinder in the direction of the central openings in said first and second members;



said piston rod being formed with a reduced diameter end that extends into and closes said central opening in said third member;

said piston rod having a central bore therein extending from its free end to an intermediate point in its length;

a diametrically extending passage in said rod at the intermediate point in the piston rod;

a source of air under pressure connected to said cylinder for moving said piston;

a side passage in said cylinder extending from the air source connection to said cylinder to a port in the side of the cylinder bore in which the piston rod extends;

said port being in alignment with said diametrically extending passage when the piston and rod have completed their movement in the direction of said plates, whereby the reduced end of said rod will move one or more pills from the central opening in said second plate into the central opening in said first plate and air under pressure will propel the pills out of the central openings into a delivery tube.

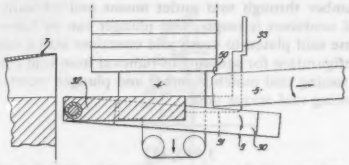
3,993,217
CIGARETTE HOPPERS

Robert William Davies, and Peter Ernest Willett, both of London, England, assignors to Molins Limited, London, England

Filed Sept. 3, 1975, Ser. No. 610,017
Claims priority, application United Kingdom, Aug. 28, 1975, 35485/75
Int. Cl.³ B65H *3/40*
U.S. Cl. 221—93 **8 Claims**

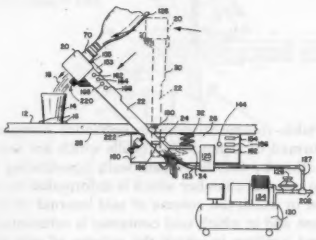
1. In a hopper for a cigarette-packing machine comprising a plurality of vertical cigarette-guiding channels, a set of horizontally-reciprocable plungers arranged to move across the lower ends of said channels to feed a selected number of cigarettes from each channel, a horizontal base plate extending across said channels below said plungers, and a set of lowering vanes interdigitated with said plungers to support

cigarettes in said channels during each return stroke of the plungers and permit controlled descent of cigarettes on to said base plate between each return stoke and the following forward stroke of the plungers, the improvement comprising a



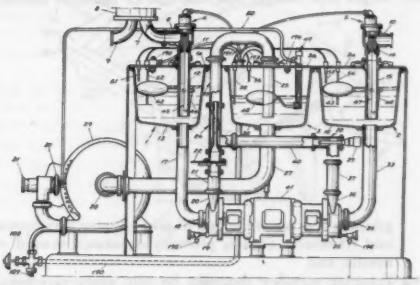
pivotal mounting for each of said plungers, said pivotal mountings having a horizontal pivot axis to permit the plungers to be inclined downwardly during each return stroke of the plungers.

3,993,218
LIQUOR DISPENSER
Arthur M. Reichenberger, 1916 N. 21st Place, Phoenix, Ariz. 85006
Filed Mar. 7, 1975, Ser. No. 556,498
Int. Cl.² B67D *5/56*
U.S. Cl. 222—30 **16 Claims**



1. In a liquor dispenser the combination of: an electromagnetic means; said electromagnetic means comprising a generally ring-shaped electromagnetic coil having a central opening therein; a bottle cap and spout means adapted to be secured to the neck of a liquor bottle or the like; said bottle cap and spout means having a dispenser spout provided with an outlet passage therein; a magnetically responsive valve in said spout means; a spout holder adjacent to said electromagnetic means and adapted to receive said spout in a position centrally of said ring-shaped electromagnetic means; conduit means for conducting compressed pneumatic fluid into said spout holder; a source of compressed pneumatic fluid communicating with said conduit means; second means on said bottle cap and spout means adapted to be pneumatically and sealingly coupled to said conduit means when said spout is inserted in said holder; said second means disposed to conduct pneumatic fluid under pressure into a bottle with which said cap is connected for forcing liquid outwardly through said magnetically responsive valve; said spout holder comprising guide means in adjacent relation to said electromagnetic means for engaging said spout and for pneumatically coupling said second means; switch means disposed and adapted to energize said electromagnetic means; and magnetic valve means coupled to said conduit and in circuit with said switch means and energizeable thereby; said magnetic valve means adapted to admit said compressed pneumatic fluid into said conduit means and through said second means into said bottle for forcing liquid outwardly through said outlet passage and said magnetically responsive valve when opened by said electromagnetic means.

3,993,219
METERING AND MIXING APPARATUS FOR A PLURALITY OF LIQUIDS
Mario Carlos Franzosi, Cordoba, Argentina, assignor to Jose Francisco Franzosi and Alberto Lorenzo Franzosi, both of Cordoba, Argentina, part interest to each
Filed Jan. 20, 1976, Ser. No. 650,598
Claims priority, application Argentina, Jan. 24, 1975, 257414
Int. Cl.² B67D *5/14, 5/60*
U.S. Cl. 222—56 **18 Claims**



1. A metering and mixing apparatus for a plurality of liquids each supplied from a respective source, the machine comprising a plurality of storage tanks, one for each of the liquids to be mixed; a first supply conduit for each of said tanks, each supply conduit having an inlet connected to a respective source of the corresponding liquid to be mixed, and an outlet discharging downwardly into the respective tank from the upper part thereof, said first conduit reaching down to a comparatively short distance from the tank bottom, and a second output conduit for each of said tanks and having an inlet and an outlet, this inlet being connected to the bottom of the corresponding tank substantially in axial alignment with the outlet of said first conduit, a liquid pump for each tank and having an intake and an exhaust, this intake being connected to the outlet of said corresponding second output conduit; a third discharge conduit for each of said pumps, said exhaust of each pump being connected to the inlet of the corresponding third discharge conduit which is provided with an outlet; a single fourth mixed product output conduit having a plurality of inlets each connected to one of the outlets of said third discharge conduits; an interchangeable metering orifice plate arranged within the flow path between one of said third conduits and said fourth conduit, said plate being interchangeably mounted to allow its replacement by other plates having metering orifices of different size, and a micrometrically adjustable metering orifice device arranged between each of the remaining third conduits and said fourth conduit, an intake control valve for each of said first conduits, a float arranged in each tank and mechanically linked to its corresponding intake control valve for closing said intake control valve when the liquid in said tank rises above a predetermined level, and a single drive means for all said liquid pumps.

3,993,220
FLEXIBLE CONTAINER OPENER AND DISPENSER
William A. Troy, 322 Mohawk, Park Forest, Ill. 60466
Filed Aug. 1, 1975, Ser. No. 600,939
Int. Cl.² B65D *35/28*
U.S. Cl. 222—82 **9 Claims**

1. An opener and dispenser for flexible containers, comprising:

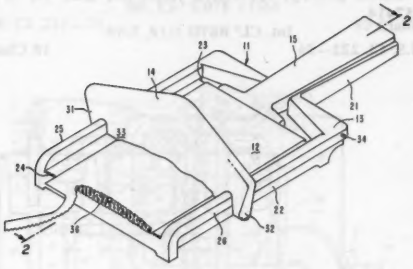
a body member, said body member having a platform;

a handle projecting from one end of said body member;

a cutting edge along an opposite end of said body member;

a gripping arm pivotally mounted on said body member for gripping one end of a flexible container, said gripping arm having a transverse edge;

said platform includes a transverse lip at its end opposite the cutting edge, said lip being structured for cooperative gripping engagement with said transverse edge of the



gripping arm when the end of said gripping arm opposite said transverse edge is pivotally depressed toward said handle; and

a scraping member mounted on said body member for longitudinal sliding along said body member and over a flexible container.

3,993,221

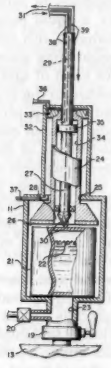
CLOSED SYSTEM CHEMICAL TRANSFER APPARATUS

Edgar M. Boynton, Port Hueneme, and William H. Roberts, Ventura, both of Calif., assignors to Western Farm Service Inc., Oxnard, Calif.

Filed Oct. 24, 1975, Ser. No. 625,456

Int. Cl.² B67B *7/24*

U.S. Cl. 222—87 **5 Claims**



1. A closed system chemical transfer apparatus including, in combination:

a. a receiving chamber having an access door for receiving and enclosing within said chamber a container of chemicals;

b. an outlet means communicating with the bottom of said chamber;

c. a hollow plunger member extending down through the top of said chamber and terminating within the upper end of said chamber in a crusher platen; and,

d. a punch member coaxially disposed and movable within said plunger member, the lower end of said crusher platen having an opening through which said punch member can extend whereby a container of chemical may be enclosed in said chamber and said punch member lowered to pierce through the top and bottom of said container to permit chemical in said container to transfer from said chamber through said outlet means and whereby after said container is empty, said plunger can be lowered to cause said platen to crush said container into a compact configuration for subsequent removal from said chamber by raising said punch member and plunger member and opening said access door.

3,993,222

VARIABLE-VOLUME DISPOSABLE APPLIANCE

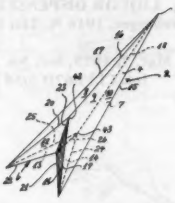
David Briggs, 200 Hamburg 6, Geffckenstr. 6, Germany

Filed Aug. 19, 1975, Ser. No. 605,828

Claims priority, application Germany, Aug. 21, 1974, 2439975

Int. Cl.² B65D *35/04*

U.S. Cl. 222—107 **14 Claims**



1. A variable-volume disposable appliance comprising a container formed of a plurality of walls which are separated from each other by fold lines, said walls constituting means bounding an internal chamber which is deformable between a first position in which the volume of said internal chamber is at a minimum and in which said container is substantially flat and a second position in which the volume of said internal chamber is at a maximum and yet a third position in which the volume of said internal chamber is again at a minimum, said container being consecutively deformable from said first to said second and third positions by means of a force applied in only one direction, said container being capable of aspirating a medium when deformed either from said first or third position towards said second position and of expelling a medium when deformed from second position towards either of said first or third positions, in which different ones of said walls abut one another with their respective inner surfaces, the aforesaid deformation causing bending of the material only at said fold lines.

3,993,223

DISPENSING CONTAINER

George W. Welker, III, Downingtown, and Joseph E. Brady, West Chester, both of Pa., assignors to American Home Products Corporation, New York, N.Y.

Filed July 25, 1974, Ser. No. 491,903

Int. Cl.² B65D *35/08*

U.S. Cl. 222—107 **7 Claims**

1. A sealed dispensing container for a liquid medicament comprising a unitary molded container including:

A. An elongated continuously curvilinear middle portion;

B. A hemi-ellipsoidal portion closing one end of said middle portion;

C. A truncated conical portion having its larger end connected to said middle portion opposite said hemi-ellipsoidal portion;

D. A substantially cylindrical portion connected to said truncated conical portion;

E. A first integral tab closing one end of said cylindrical portion;

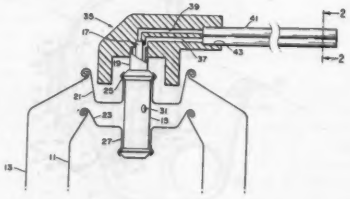
F. A second integral tab connected to said hemi-ellipsoidal portion; whereby when said first and second tabs are rotated in opposite directions said cylindrical portion shears adjacent said first tab defining a discharge orifice.

3,993,224

SPOUT FOR TWO-COMPONENT RESIN DISPENSER

Stanley Harrison, Bedford, Mass., assignor to Aerosol Investments, Ltd., Boston, Mass.

Filed Sept. 8, 1975, Ser. No. 611,220
Int. Cl.² B67D *5/60*
U.S. Cl. 222—145 **2 Claims**



1. In a pressurized dispenser for a two-component resin which hardens when the two components come into contact, said dispenser having a valve structure providing a pair of ports through which the respective resin components are dispensed, the improvement comprising an elongate spout coupled to said valve structure, said spout being in the nature of a plastic straw of constant cross-sectional shape generally in the form of a figure-eight providing a pair of parallel, side-by-side longitudinal channels, the portions of the material of the straw forming the respective side-by-side channels being joined at a nexus between the channels, each of said channels being in communication with, at the proximal end of said spout, a respective one of said ports, said spout being of substantial length and being constructed of a material which is easily severable, whereby the distal end of said spout may be repeatedly cut off to clear the dispenser of plugs formed of said resin.

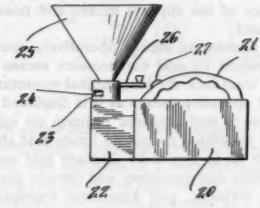
3,993,225

PORTABLE SPREADER FOR PARTICULATE MATERIAL

Mario Manni, Ossining, N.Y., assignor to Mario Manni and Don Vizioli, both of Ossining, N.Y., part interest to each

Filed Sept. 11, 1975, Ser. No. 612,569
Int. Cl.² G01F *11/06*
U.S. Cl. 222—324 **14 Claims**

1. A portable hand-operated spreader for fine particulate materials, comprising a housing, a handle on top of and affixed to said housing, a distribution chamber having a circular inner cross-section with a vertical axis and mounted on one end of said housing, said chamber having a circumferential slot on the side thereof away from said handle, and at least the central portion of the top of said distribution chamber being open, a motor mounted below said distribution chamber and having a shaft extending upwardly centrally into said distribution chamber, a rotor mounted for rotation with said shaft in said distribution chamber, the top surface of said rotor being substantially flat and aligned with said slot, a plurality of radially extending vanes on said top surface of said rotor, the radially inner ends of said vanes being spaced from the center of said rotor whereby the top surface of said rotor is free of projections in a central region of said top surface of said rotor, said vanes being spaced across said region sufficient to allow particulate material to fall into said region, said region being



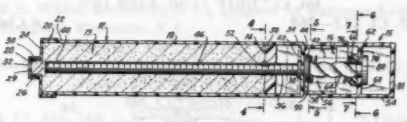
radially inwardly of and adjacent to said vanes, a hopper mounted above said distribution chamber and having an opening located on said vertical axis for directing material therein downwardly into the center of said distribution chamber and onto said vanes and into said region, valve means for adjusting the flow of material from said hopper into said distribution chamber, first control means positioned at the side of said handle toward said distribution chamber for controlling said motor, and second control means positioned at the side of said handle toward said distribution chamber for controlling said valve means, said first and second control means being positioned with respect to one another at a distance sufficient to enable finger operation by the same hand as is grasping the handle.

3,993,226

DISPENSER FOR EXTRUDABLE MATERIALS

Stanford Pavenick, 341 Scotland Road, South Orange, N.J. 07079

Filed Jan. 2, 1976, Ser. No. 646,376
Int. Cl.² B67D *5/42*
U.S. Cl. 222—327 **5 Claims**



1. An apparatus for dispensing extrudable materials, said apparatus comprising:

a. an elongated container means for holding a quantity of extrudable material, said container means including one end wall with a discharge nozzle having an opening through which said extrudable material is dispensed, said container means including another end wall remote from said one end wall;

b. compression means within said container means for compressing said extrudable material to force said extrudable material through said opening in said discharge nozzle, said compression means having a threaded rotatable shaft along which a compression element in non-rotatable cooperation with said container moves when rotatable motion is imparted to said shaft so that said compression

element thereby is longitudinally displaced within said container means;

c. a support means adjacent said another end wall, said support means extending from said another end wall in a direction away from said container means and said support means being of constant transverse cross-sectional configuration;

d. an operating means mounted for longitudinal non-rotational motion on said support means, said operating means having an idle position and an actuated position in which latter position it is displaceable inwardly on said support means, said operating means further including a biasing means to urge the operating means to said idle position, said operating means having an open end portion with an internal configuration corresponding to the outer surface of the support means and telescopicable thereover; and

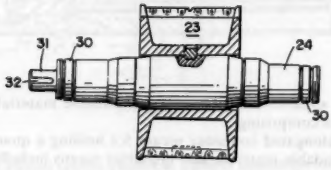
e. kinematic translating means operatively coupling said operating means to said compression means and constructed to transduce the longitudinal nonrotational motion of said operating means as it is displaced from said idle position to said actuated position on said support means into rotational motion to rotate said shaft in one direction so as to forwardly displace said compression element within said container and thereby dispense said extrudable material, said kinematic translating means preventing reverse rotational motion of said shaft when said operating means returns from said actuated position to said idle position, said kinematic translating means comprising a second shaft having a helical portion at one end disposed within said operating means and coaxial with said threaded shaft, an engagement adapted to drivingly engage an interior wall of said operating means when said operating means is urged from its idle position inwardly on said support means, said engagement having a centrally disposed opening therein rideable on and adapted to matingly engage said helical portion of said second shaft so that as said operating means is urged inwardly on said support means said second shaft will rotate, said engagement adapted to freely rotate on said second shaft as said operating means is urged to said idle position so that said engagement will not cause rotational motion of said second shaft as said operating means is restored to idle position.

3,993,227

ROTARY FEEDER VALVE

John F. Oettinger, Portland, Oreg., assignor to Esco Corporation, Portland, Oreg.

Filed Sept. 8, 1975, Ser. No. 611,187
Int. Cl.² G01F *11/10*; F16B *3/00*
U.S. Cl. 222—368 **4 Claims**



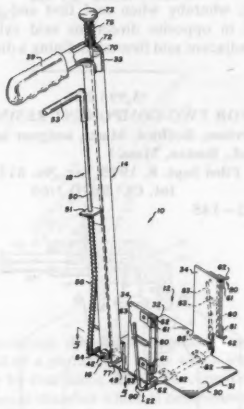
1. In a rotary feeder valve for introducing particulate material into a pressurized vessel, a casing having a top inlet arranged to be coupled to a source of said material and a bottom outlet arranged for connection to said vessel, and a pocket-equipped rotor assembly in said casing and mounted for rotation to serially move said pockets from said inlet to said outlet, the improvement wherein said rotor assembly comprises a generally cylindrical body having a plurality of radially extending pockets open at the periphery of said body and an axially extending bore, a shaft mounted in said bore and having an interference fit therewith, at least one set of openings, one in each of said shaft and in the central bottom of one of said body pockets, said openings being substantially cylindrical and having their axes aligned in a radial direction relative to said cylindrical body, and a generally cylindrical pin mounted in said aligned openings and coaxial therewith, said pin having an interference fit with both of said openings and extending across the interface between said shaft and body and constituting the main connection between said shaft and body for torque transmission therebetween.

3,993,228

HOSIERY DONNING APPARATUS

Leo Fuhr, 2004-1200 Alberni St., Vancouver, British Columbia, Canada V6E 1A6

Filed Dec. 29, 1975, Ser. No. 644,394
Int. Cl.² A47J *51/06*
U.S. Cl. 223—111 **7 Claims**



1. Apparatus for assisting a handicapped person to place a sock on his foot comprising a plate, a handle, pivot means securing the plate to an end of the handle for swinging movement between a normal position and a tilted position, holding means on the plate for releasably supporting the top of the sock open to receive the toes when the plate is held substantially parallel to the underside of the foot, and tilting means on the handle remote from the plate for swinging said plate to the tilted position as the sock is pulled over the foot and up the ankle.

3,993,229

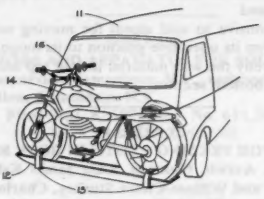
PIVOTABLE BUMPER FOR CARRYING MOTORCYCLES

Thomas Wade Summers, 9703 Michael Edward Drive, Fern Creek, Ky. 40291

Filed Jan. 29, 1975, Ser. No. 545,007
Int. Cl.² B60R *11/00*
U.S. Cl. 224—42.03 B **5 Claims**

1. An improved motorcycle carrier in combination with a vehicle, said improvement comprising: a) at least one brace means secured to a frame member of said vehicle, b) a bumper means pivotably secured to said brace means by at least one hinge for movement between a bumper mode and a carrier mode, said bumper rotatable transverse to the longitudinal direction of the vehicle, said bumper means in the bumper mode presenting a substantially vertical surface adapted to protect said vehicle from collisions and in said carrier mode presenting a substantially horizontal surface at least partially recessed for receiving and supporting a motorcycle, said bumper means having at least one abutting surface with said brace

means in the carrier mode at substantially 90° rotation to the bumper mode, whereby when said bumper is in the horizontal



position the wheels of a motorcycle may be partially received therein for transportation of said motorcycle.

3,993,230

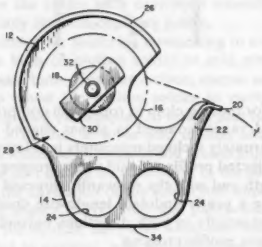
ADHESIVE TAPE DISPENSER

Thomas B. Oakes, Falls Road, Shelburne, Vt. 05482

Continuation-in-part of Ser. No. 487,123, July 10, 1974, abandoned. This application Nov. 19, 1975, Ser. No. 633,429

Int. Cl.² B26F *3/02*

U.S. Cl. 225—47 **5 Claims**



1. A dispenser of the kind comprising a support for rotatably receiving a roll of tape for rotation about a predetermined axis for withdrawal from said roll over a cutting edge parallel to the axis of the roll a length of tape; characterized in that the support embodies means for mounting and retaining the dispenser transversely on the back of the fingers of the hand with the axis of the roll of tape substantially parallel to the fingers so that the direction of the tape as drawn off is transverse to the hand, comprising an elongated finger gripping opening in the support spaced from and parallel to the axis of the roll of tape, said finger gripping opening being of a size to receive the proximal phalanx of a finger so that the medial and distal phalanxes extend beyond the support to assist in holding and manipulating a part to which the tape is to be applied and a bearing element situated laterally of the finger gripping opening having a concave surface, having a radius of curvature which corresponds substantially to the finger opening, said concave surface being spaced from and parallel to the axis of the roll of tape and at a lateral distance from the finger gripping opening such as to have engagement with the adjacent finger in its normal position of adjacency, said finger gripping opening and concave bearing surface collectively provide transversely spaced supports by means of which the device is supported at the back side of the fingers substantially perpendicular to and transversely of the back of the hand and said concave bearing surfaces by engagement with the adjacent finger preventing rotation of the device about the finger engaged with the finger gripping opening.

3,993,231

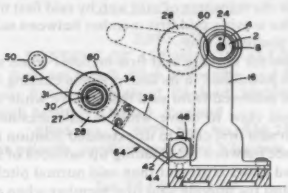
TUBE CUTTING APPARATUS

Levi Monteiro, Plymouth, and Joseph F. Ogorzalek, Marshfield, both of Mass., assignors to Armstrong Cork Company, Lancaster, Pa.

Filed Feb. 2, 1976, Ser. No. 654,635

Int. Cl.² B26F *3/00*

U.S. Cl. 225—96 **2 Claims**



1. A tube cutter adapted to simultaneously make a plurality of circumferential, longitudinally-spaced cuts incompletely through the wall thickness of a mandrel-mounted elongated tube of rubber or the like so that the cut tube can be removed from the mandrel and further processed as a unit, and then, if desired, be subsequently broken apart at the location of the cuts to produce short tube sections, said tube cutter comprising:

a. a rotatable mandrel adapted to support a tube to be cut and having a length sufficient to protrude beyond the ends of said tube to provide bare ends on said mandrel during cutting,

b. means for rotating said mandrel,

c. a knife-bearing shaft,

d. circular knives positioned in spaced relationship to each other along the axis of said shaft,

e. rotatable spacing discs positioned on said knife-bearing shaft at the outer ends thereof and adapted to engage the bare ends of said mandrel, during cutting, said spacing discs having a diameter sufficient to allow said knives to penetrate said tube to a depth adjacent the inner surface thereof without touching said mandrel, and

f. means for moving said knife-bearing shaft to a position wherein said spacing discs engage the bare ends of said mandrel when said knives are in cutting engagement with a tube mounted thereon.

3,993,232

SHUTTLE MECHANISM

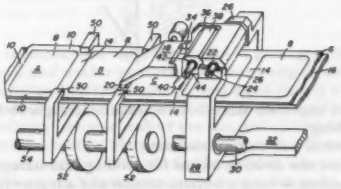
Neil S. White, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Sept. 17, 1974, Ser. No. 506,926

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 17, 1976

Int. Cl.² B65H *17/40*

U.S. Cl. 226—68 **7 Claims**



1. In a shuttle mechanism for use in intermittently transporting a stretchable web having spaced first, second, and third succeeding grooves of a normal pitch in its normal unstretched condition; the combination comprising:

a first member reciprocally movable between initial and final positions for intermittently transporting a web, said first member having a first claw at one end thereof provided with a leading tip surface for engaging a first groove in said web;

a second member supported by said first member for movement between extended and retracted positions, and having a second claw provided with a leading tip surface for engaging a succeeding second groove in said web and assisting in the transport of said web by said first member;

first means for moving said first member between said initial and final positions; and

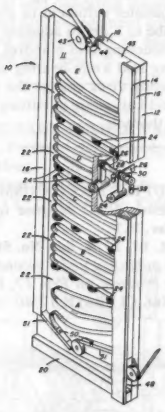
second means for moving said first member when said first member is positioned in its final position causing said first claw to be removed from said first groove while allowing said second claw to move while in said second groove away from said first claw to its extended position in which the distance between said leading tip surfaces of said first and second claws is greater than said normal pitch of said grooves, and for moving said first member when said first member is returned to its initial position causing said first claw to move into said second groove and said second claw into a succeeding third groove, and further moving while in its third groove to its retracted position, in which the distance between said leading tip surfaces of said first and second claws and the distance between said second and third grooves are both equal to said normal pitch whereby said claws are in position to transport said web a distance equal to said normal pitch upon movement of said first member to its final position.

3,993,233

WEB SLACK BOX HAVING A PLURALITY OF SECTIONS

Roger Edwin Bartell, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Jan. 16, 1976, Ser. No. 649,605
Int. Cl.² B65H *17/50*
U.S. Cl. 226—118 **12 Claims**



1. An improved slack box for accumulating web material comprising:

a vertical web storage chamber;

at least one dividing means for dividing said storage chamber into at least a bottom section and a top section, said dividing means being movable between a normal operative position wherein said dividing means divides said storage chamber into said sections and prevents web material in said top section from passing into said lower section, and an inoperative position wherein said storage chamber is undivided and web material in said top section is free to pass into said lower section;

means for sensing the amount of web material in one of said sections and for generating a signal when the amount of web material in that section reaches a predetermined amount; and

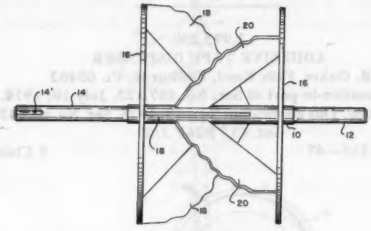
means responsive to said signal for moving said dividing means from its operative position to its inoperative position whereby the web material in said top section passes into said bottom section.

3,993,234

REEL FOR FEEDING CLOTH IN ROPE FORM

Christoph W. Aurich, Clemson, S.C.; James Keith Turner, Lincolnton, and William Cleere Sturkey, Charlotte, both of N.C., assignors to Gaston County Dyeing Machine Company, Mount Holly, N.C.

Filed Jan. 21, 1976, Ser. No. 651,129
Int. Cl.² B65H *27/00*
U.S. Cl. 226—193 **5 Claims**



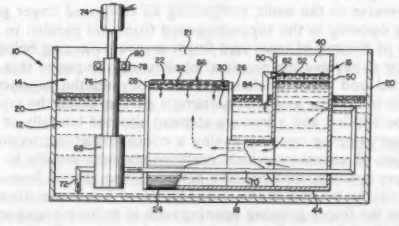
1. A reel for feeding cloth in rope form comprising a plurality of spaced vanes mounted in planes aligned with the reel axis and alternately inclined oppositely in relation to said axis with the projected profiles of said vanes crossing intermediate of their length and with the outwardly directed edges of said vanes having a gently undulate lengthwise configuration extending substantially in both directions beyond the point of projected vane profile crossing.

3,993,235

DIFFERENTIAL PRESSURE WAVE SOLDERING SYSTEM

Kenneth G. Boynton, Milford, N.H., assignor to Hollis Engineering, Inc., Nashua, N.H.

Filed Sept. 2, 1975, Ser. No. 609,239
Int. Cl.² B23K *3/06*
U.S. Cl. 228—37 **12 Claims**



1. In a wave soldering system comprising a container for holding a supply of molten solder, and a sump and nozzel adapted to be partially submerged in said supply of molten solder, the improvement comprising a sump having at least two interior chambers, said chambers being separated from one another by one or more partitions disposed interiorly of said sump, said at least two chambers being in fluid communi-

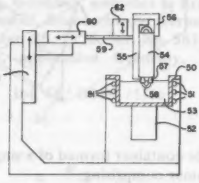
cation with one another at a common nozzle, and means for supplying molten solder under pressure to said chambers, the pressure at which said solder is supplied to at least one of said chambers being different from the pressure at which said solder is supplied to the remaining chambers.

3,993,236

METHODS AND APPARATUS FOR SOLDERING

John N. Antonevich, Jamestown, N.Y., assignor to Blackstone Corporation, Jamestown, N.Y.

Filed Sept. 8, 1975, Ser. No. 611,202
Int. Cl.² B23K *1/06, 1/08*
U.S. Cl. 228—110 **10 Claims**



1. A method of soldering capillary joints comprising the steps of immersing the part to be soldered in a molten bath of solder, causing the solder bath to cavitate and simultaneously subjecting the part to one of vibratory and impact energy separate from the solder bath cavitation whereby the solder moves uniformly into the capillary joints.

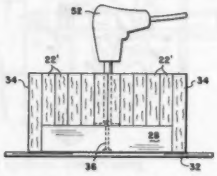
7. An apparatus for soldering comprising in combination a solder pot, a bath of molten solder in said pot, means for maintaining said bath of solder molten, means acting on said solder pot to cause the molten solder to cavitate, support means adjacent said pot adapted to hold a part to be soldered immersed to a desired level in said molten solder with the surfaces to be soldered immersed, and means adjacent the pot acting on said part during its immersion in the solder simultaneously with the cavitation of the solder and imparting one of vibratory and impact energy into said part while said part is immersed in the molten bath and while the bath is simultaneously caused to cavitate, whereby the immersed surface is uniformly coated with solder.

3,993,237

METHOD FOR PROVIDING HIGH-TEMPERATURE INTERNAL INSULATION

Robert A. Sauder; Gary R. Kendrick, and John R. Mase, all of Emporia, Kans., assignors to Sauder Industries, Inc., Emporia, Kans.

Continuation of Ser. No. 445,807, Feb. 25, 1974, abandoned, which is a division of Ser. No. 157,433, June 28, 1971, Pat. No. 3,819,468. This application July 14, 1975, Ser. No. 595,738
Int. Cl.² B23P *21/00*
U.S. Cl. 228—140 **9 Claims**



1. A method of protecting the inside wall of a furnace, comprising:

constructing a plurality of insulating blocks, with each of said blocks having a flat side adapted for attachment to the inside wall of a furnace and being comprised of side-by-side srips of material composed of insulating fibers, the fibers having no particular orientation but forming a plurality of planes substantially parallel to each other and generally perpendicular to said flat side of said blocks; and

attaching each of said blocks to said furnace wall.

3,993,238

BONDING OF ALUMINIUM ALLOYS

Greville Bertram Brook, High Wycombe, and William Henry Bowyer, Farnham, both of England, assignors to Fulmer Research Institute Limited, England

Filed Jan. 2, 1975, Ser. No. 538,210
Claims priority, application United Kingdom, Jan. 4, 1974, 478/74
Int. Cl.² B23K *1/04*
U.S. Cl. 228—198 **4 Claims**

1. A process for bonding aluminium alloy parts, which comprises the steps of:

i. removing the oxide film from the surfaces of the parts which are to be bonded,

ii. forming a coating of zinc directly on the oxide film-free surfaces,

iii. providing additional separate layers of copper and tin,

iv. forming an assembly with the zinc coatings and said additional layers positioned between the parts to be bonded, and

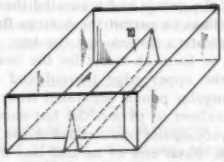
v. maintaining said assembly under sufficient pressure to keep the integers thereof in contact over the desired bond area and at a temperature of from 250° to 300° C whereby the zinc and the tin are diffused into the adjacent integers and the aluminium alloys parts are bonded together with a layer of copper between them.

3,993,239

STACKABLE CARDBOARD BOX, IN PARTICULAR FOR FRUIT AND SIMILAR PRODUCTS

Heribert G. Exel, Wienerbruckstrasse 104, Sudstadt, Vienna, Austria A2344

Filed Apr. 23, 1975, Ser. No. 570,897
Claims priority, application Germany, Mar. 4, 1975, 2509298
Int. Cl.² B65D *5/35, 5/22*
U.S. Cl. 229—23 R **7 Claims**



1. A stackable box especially useful in packaging and handling fruit and similar products, said box being formed from three separate blanks including a first blank having a central panel defining the bottom wall of the box and two side panels each defining one side wall of the box and second and third substantially identical blanks one defining each end wall of the box when assembled with said first blank, said side panels and central panel each having assembly flanges integrally formed on their opposed ends overlaying and attached to the outer surface of said second and third blanks along the bottom and side edges thereof when said blanks are assembled to form said box, the improvement wherein each of said blanks is formed from corrugated paperboard with the corrugations in

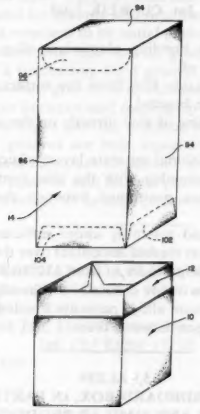
said end walls and in said side panels running generally vertically, and wherein said bottom panel includes a portion extending upwardly from said bottom wall and defining a separating wall in said box, said separating wall being in the general form of an inverted V with the side areas thereof being separated at the bottom of said box.

3,993,240

BLANKS FOR FORMING A RECTANGULAR BOX AND LID

Glen Matsuyama, Los Angeles, Calif., assignor to Graphic Arts Packaging Corporation, Gardena, Calif.

Filed Dec. 10, 1975, Ser. No. 639,387
Int. Cl.² B65D *43/04, 13/04*
U.S. Cl. 229—23 BT **5 Claims**



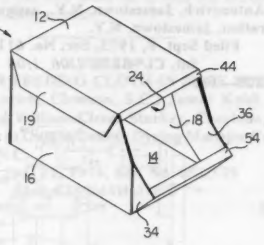
1. Three blanks for forming a generally rectangular box with a detachable rectangular lid, the first of the blanks serving to form the box and comprising four adjacent rectangular panels separated from one another by respective scorelines to permit the panels to be folded into a rectangular shape, an end flap attached to the distal edge of an end of one of the panels to be glued to the other end panel to hold the first blank in its rectangular configuration, and bottom flaps attached to the lower edges of the panels and separated therefrom by corresponding scorelines to permit the bottom flaps to be folded over and constitute a bottom for the box; a second of the blanks serving to form an insert for the box protruding upwardly from the upper edge thereof and comprising four adjacent rectangular panels separated from one another by respective scorelines to permit the last-named panels to be folded into a rectangular open-ended shape, and an end flap attached to the distal end of an end one of the last-named panels to be glued to the other end one of the last-named panels to hold the insert in its rectangular shape; and a third of the blanks serving to form a lid for the box and comprising four adjacent rectangular panels separated from one another by respective scorelines to permit the last-named panel to be folded into a rectangular lid to fit over the protruding portion of the insert and against the upper edge of the box, said third blank having an end flap attached to the distal end of an end one of the last-named panels to be glued to the other end one of the last-named panels to hold the lid in its rectangular shape, and said third blank also having at least one flap attached to the upper edge of at least one of the last-named panels and separated therefrom by a scoreline to permit the last-named flap to be folded over to constitute a cover for the lid.

3,993,241

COLLAPSIBLE CONTAINER

Benjamin A. Downing, Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Mar. 1, 1976, Ser. No. 662,651
Int. Cl.² B65D *5/72*
U.S. Cl. 229—33 **10 Claims**



1. A collapsible container formed of a single cut and scored blank, the container comprising:

a pair of sides;

a top and bottom, said sides being hingedly connected to opposite edges of said bottom, and said top being hingedly connected to one edge of one of said sides, said top, bottom, and sides defining an open ended generally rectangular shape in the assembled and opened condition;

means to permit securing of said top to the other one of said sides;

means to close one end of the container;

a front panel hingedly connected to the bottom at the open end thereof, said front panel having a pair of front flaps respectively hingedly connected to opposite side edges of said front panel, each of said front flaps foldably overlying the inner face of the respective sides; and

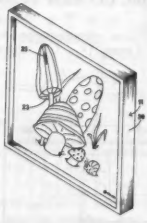
a locking panel hingedly connected to said top and overlying the inner face of said top in an inwardly folded condition, said top locking panel being folded inwardly to cooperatively engage each of said front flaps, thereby securing said flaps and front panel in the open position and defining a partially open area at the front of the container.

3,993,242

OIL PAINTING COIN BANK

Cathy Guy, 4709 McArthur Circle, and Judy Hicks, 4612 NE. Dearborn, both of Lawton, Okla. 73501

Filed July 9, 1975, Ser. No. 594,336
Int. Cl.² A47G *29/00*
U.S. Cl. 232—4 R **10 Claims**



1. A coin bank comprising an open frame, a flexible sheet material fastened to cover the opening on the front of said frame; said sheet material having an elongated opening therein to permit the insertion of a coin through said sheet

material and a decorative illustration on the front surface thereof; and a coin container formed at least in part of flexible material having an opening therein said container being supported within said frame from the upper portion thereof in spaced apart relation to said sheet material and with its opening maintained substantially coincident with the opening in said sheet material, said container further having aperture means for permitting removal of coins from said container other than through said openings.

3,993,243

CENTRIFUGE DRUM AND METHOD OF MAKING SUCH CENTRIFUGE DRUM

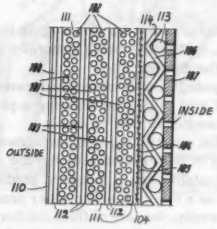
Walter Dietzel; Siegfried Matusch, and Volkmar Hentschel, all of Braunschweig, Germany, assignors to Braunschweigische Maschinenbauanstalt, Braunschweig, Germany

Filed Mar. 25, 1975, Ser. No. 561,790

Claims priority, application Germany, Apr. 4, 1974, 2416305

Int. Cl.² B04B *15/06*

U.S. Cl. 233—2 **13 Claims**



1. In a centrifuge drum having a radially outer wall for supporting an internal strainer on its radially inner surface and a pair of end walls affixed to said outer wall, the improvement wherein said radially outer wall comprises a first layer of a plurality of cross-wise oriented fibers, a second layer radially inwardly of said first layer forming said radially inner surface of said radially outer wall and comprising a thin fine-meshed stainless steel fabric, and a plastic resin in which said first and second layers are embedded, said end walls having axially extending upper flanges to which said radially outer wall is affixed.

3,993,244

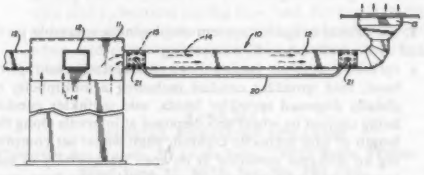
HEATING SYSTEM

Don A. Taylor, Box 4, Wadsworth, Ohio 44281

Filed Nov. 19, 1975, Ser. No. 633,482

Int. Cl.² F24D *5/02*

U.S. Cl. 237—53 **3 Claims**



1. A heating system, comprising;

A. a heat-generating source;

B. a first heat exchanger disposed adjacent to said heat source;

C. at least one register outlet;

D. a second heat exchanger disposed adjacent to said register;

E. an air-conducting duct system interconnecting said heat source, said heat exchangers, and said register; and

F. a heat-conducting tube

1. interconnecting said first and second heat exchangers,
2. disposed at least partially externally of said ducting system, and
3. carrying a quantity of thermally conductive liquid.

3,993,245

METHOD AND APPARATUS FOR SPRAYING AGROCHEMICALS

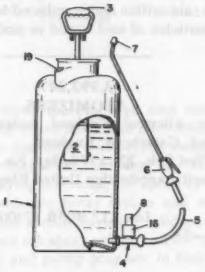
Colin P. Smith, Johannesburg, South Africa, assignor to Shell Oil Company, Houston, Tex.

Filed Feb. 3, 1976, Ser. No. 654,815

Claims priority, application United Kingdom, Feb. 6, 1975, 5081/75

Int. Cl.² A62C *13/40*

U.S. Cl. 239—8 **4 Claims**



3. A method of safely applying an agrochemical formulation to a locus, which comprises loading water into a spray tank connected through a spray valve to at least one spray nozzle and communicating with a charging valve which incorporates puncturing means, attaching to the charging valve a container containing a chemical formulation under super-atmospheric pressure, puncturing the container with the puncturing means, permitting the formulation to flow from the container into the spray tank under the action of pressure whilst maintaining a substantially fluid-tight seal between the container and the charging valve, whereby the formulation is mixed with the water whilst the escape of formulation to the atmosphere is minimized or prevented, and releasing the spray valve to feed the resultant aqueous chemical mixture from the spray tank through the spray nozzles as a spray which is distributed over the locus.

3,993,246

NEBULIZER AND METHOD

Elisha W. Erb, 444 Main St., Fitchburg, Mass. 01420, and Darrel R. Resch, 30 Walnut St., Leominster, Mass. 01453

Filed June 19, 1975, Ser. No. 588,353

Int. Cl.² B05B *17/04*

U.S. Cl. 239—8 **7 Claims**

1. Method for reducing a flowable liquid to an ultrafine dispersion of liquid particles in a propellant gas comprising the steps of:

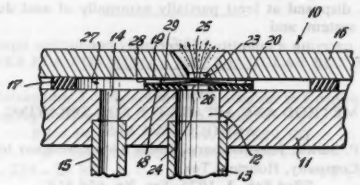
a. confining a pressurized flowable liquid within a closed chamber having, as the only means of escape, a flexible liquid orifice having a restricted width;

b. confining a pressurized gas within a chamber having an orifice communicating with said flexible liquid orifice;

c. adjusting the pressure of said flowable liquid and/or of said gas such that on release of both from their respective chambers said flexible liquid orifice is flexed to the small-

est possible spacing which will permit said flowable liquid to flow therethrough;

d. releasing said pressurized flowable liquid and said pressurized gas from their respective chambers to flex said



liquid orifice and cause said flowable liquid to pass therethrough as a thin liquid stream having a thickness of less than about 0.010 inch which contacts said pressurized gas as it exits said orifice and is reduced to an ultrafine dispersion of particles of said liquid in said gas.

3,993,247

ATOMIZERS

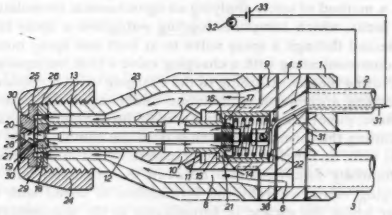
Terence Tyler, Allestree, England, assignor to Clarke Chapman Limited, Gateshead, England

Filed Feb. 27, 1975, Ser. No. 553,657

Claims priority, application United Kingdom, Feb. 28, 1974, 9032/74

Int. Cl.² B05B *12/00*

U.S. Cl. 239—73 **2 Claims**



1. An atomiser of the recirculating type for liquid fuel, which comprises support means, tubular body means having an outer tubular member and an inner tubular member mounted on said support means, said outer and inner members defining a flow path therebetween, orifice means defining a discharge orifice at one end of said body means; a lance located in said inner tubular member of said body member and having at a front end thereof a tip engageable against said orifice means to shut off said discharge orifice; said inner member and said lance defining a flow path therebetween; and carrier means mounted in a rear end of said inner member and supporting said lance at a rear end thereof for endwise movement of said lance relative to said body means; wherein the improvement comprises an electrical circuit means which comprises indicator means and which is partly formed by said body means and said lance, said carrier means comprising insulator means electrically insulating said lance at said rear end from said body means, said circuit means being completed to activate said indicator means by engagement of said orifice means upon endwise movement of said lance to shut off said orifice.

3,993,248

FLUID FLOW REGULATOR

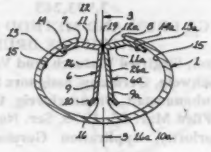
Richard C. Harmony, Tucson, Ariz., assignor to Harmony Emitter Company, Inc., Tucson, Ariz.

Filed Aug. 13, 1975, Ser. No. 604,146

The portion of the term of this patent subsequent to Nov. 4, 1992, has been disclaimed.

Int. Cl.² B05B *1/32*

U.S. Cl. 239—107 **16 Claims**



1. A fluid flow regulator for maintaining a constant fluid discharge rate through an aperture of a conduit conveying fluid under pressure, said regulator comprising in combination:

a. a fluid discharge outlet for discharging fluid from within the conduit, said outlet being generally coincident with the wall of the conduit;

b. a pair of opposed flexible elements depending from opposite sides of said outlet for defining a passageway from within the conduit to said outlet;

c. bias means for constricting said passageway in proportion to variations in fluid pressure within the conduit; and

d. means for establishing a pressure gradient within said passageway as a function of the water pressure within the conduit; whereby, the rate of fluid discharge through said outlet is maintained at a constant rate despite variations in pressure within the conduit.

3,993,249

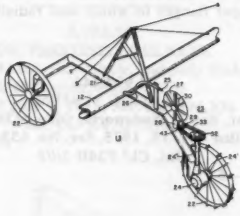
IRRIGATION SYSTEM

Arthur J. Hieb, 501 18th St., Rupert, Idaho 83350

Filed Nov. 29, 1974, Ser. No. 528,051

Int. Cl.² A01G *25/09*

U.S. Cl. 239—177 **6 Claims**



1. An orbital irrigation system employing a rotatable pivot head as a supply take-off, comprising:

a sprinkler conduit issuing horizontally from said pivot head, said sprinkler conduit including a multiplicity of distally disposed sprinkler heads, said sprinkler conduit being carried by wheel sets disposed at intervals along the length of said sprinkler conduit, each wheel set comprising an A-frame mounted at its apex transversely to said conduit and wheels journally mounted at the lowermost terminal ends of said A-frame, at least one of said wheels being provided with a gear box driven by combination means for providing mechanical rotation to said gear box and for dispensing a spray of water supplied from said sprinkler conduit, horizontal and lateral stressing includ-

ing a multiplicity of spars issuing transversely at intervals from said sprinkler conduit, and cable fastened to said conduit at a point distally from said pivot over terminal ends of said spars to alternate bases of said spar at said conduit; and

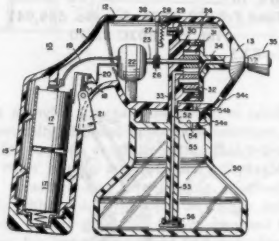
a drive carriage assembly including a frame mounted distally from the terminal end of said sprinkler conduit opposite said pivot, wheels disposed transversely to said supply conduit mounted to said frame, and a motor and transmission mounted on said frame and mechanically connected to said wheels.

3,993,250

APPARATUS FOR SPRAYING LIQUID MATERIALS

Alan H. Shure, 333 E. Ontario, Apt. 2701B, Chicago, Ill. 60611

Filed May 19, 1975, Ser. No. 578,647
Int. Cl.² B05B *9/043*
U.S. Cl. 239—332 **2 Claims**



1. A hand spray apparatus for producing a finely divided spray of liquid material in which a housing of generally pistol-shaped configuration includes a pumping assembly for pumping liquid through an inlet from a receptacle out through a restricted orifice spray head associated with said housing, the improvement including:

a hollow vacuum stem member mounted within said receptacle and having a bottom end extending substantially to the bottom of said receptacle and having an upper end forming a sealing face,

a fastening means on both said housing and said receptacle for moving said receptacle toward and in securing engagement to the housing,

means for continuously venting the interior of said receptacle to the atmosphere,

the aforesaid pumping assembly having an inlet opening forming a sealing face extending toward said upper end of said hollow stem member, and

one of said sealing faces being frustoconical shaped and the other one of said sealing faces being cylindrical shaped whereby, when said receptacle is moved toward said housing and secured thereto, said frustoconical shaped sealing face is forced into an air-tight sealing relationship with said cylindrical sealing face, and, further including a manual reset means for engaging said pumping assembly when said pumping assembly is in a frozen condition to rotate the same to an operative condition.

3,993,251

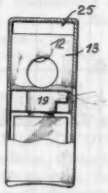
MANUAL PRESSURE SPRAYER

Christian des Garets, 52 av de Saxe, 75015 Paris, France

Filed June 27, 1975, Ser. No. 591,154
Int. Cl.² B05B *1/02*
U.S. Cl. 239—579 **5 Claims**

1. A device for spraying liquid comprising:

a case having a wall provided with a spray aperture; a container of the liquid to be sprayed located inside said case, said container being closed by a pump plug which is movable between an at-rest position and a spraying position, said pump plug having a discharge orifice which in the spraying position of said pump plug is in register with the spray aperture; a slide located inside said case, said slide being movable between an at-rest position and a spraying position in which the slide has engaged and moved said pump plug to its spraying position, said slide being capable of actuation by the user's finger engaged in a finger aperture in said case; and a screen disposed between said pump plug and the spray orifice, said screen



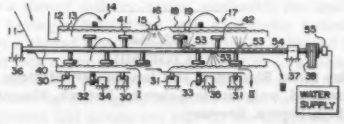
having an aperture therethrough and being in sliding engagement with the wall of said case which is provided with said spray aperture, said screen being movable by said slide such that when said slide and said pump plug are in their spraying positions, the aperture in said screen is in register with the spray orifice and with the spray aperture and said screen having a solid portion which is disposed between the spray orifice and the spray aperture when said slide and pump plug are in their at-rest position.

3,993,252

METHOD AND APPARATUS FOR RECOVERING CRUDE PULP STOCK FROM MUNICIPAL WASTE

Kanichi Ito, Yokohama, and Yoshio Hirayama, Kamakura, both of Japan, assignors to Ebara Manufacturing Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 464,219, April 25, 1974, abandoned. This application July 16, 1975, Ser. No. 596,526
Claims priority, application Japan, May 1, 1973, 48-49339
Int. Cl.² B02C *23/38*
U.S. Cl. 241—21 **3 Claims**



1. A method for recovering crude pulp stock from municipal waste containing food waste and crude pulp stock, the method comprising the steps of:

beating and agitating said municipal waste without adding water and thereby pulverizing said food waste;

removing the pulverized food waste;

slightly moistening the remaining municipal waste;

beating and agitating the moistened remaining municipal waste thereby pulverizing said crude pulp stock; and

removing the pulverized crude pulp stock.

3,993,253

DISINTEGRATED DEVICES

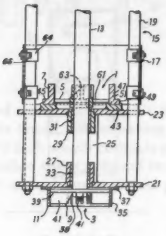
Gordon David Love, Waterside, Chesham, Buckinghamshire, England

Continuation-in-part of Ser. No. 315,309, Dec. 15, 1972, Pat. No. 3,897,013. This application Feb. 20, 1975, Ser. No. 551,263

Claims priority, application United Kingdom, Dec. 17, 1971, 58880/71

Int. Cl.² B02C *18/08*

U.S. Cl. 241—46.11 **12 Claims**



1. A disintegrating device comprising

a rotor which comprises an elongated shaft, a rotor plate mounted on the shaft, and a plurality of blades projecting from one side of the rotor plate,

a stator which is disposed coaxially of the rotor shaft, the rotor being arranged with the rotor blades within the stator, and the stator comprising means for cooperating with the blades on the rotor, when the rotor is rotated, in effecting a reduction in size of lumps of solid, and

retaining means formed with aperture means of a predetermined size,

means for supporting the stator and the retaining means so that the retaining means are disposed radially outwardly of the stator and extend axially beyond an axially outer end of the stator; whereby the rotor upon rotation may draw a mixture of liquid and solid in which the device can be immersed in an axial direction towards the axially outer end of the stator, the blades on the rotor and the cooperating means on the stator then effecting a reduction in size of lumps of the solid, the rotating rotor then forcing the liquid and the lumps of solid outwardly towards the retaining means, and the retaining means retaining large lumps of solid in the vicinity of the rotor and the stator while smaller lumps are able to move away via the aperture means.

3,993,254

AGITATOR MILL

Vladislav Bicik, Birsfelden, and Jan Kaspar, Muttenz, both of Switzerland, assignors to Gebruder Netzsch, Maschinenfabrik, Selb/Bayern, Germany

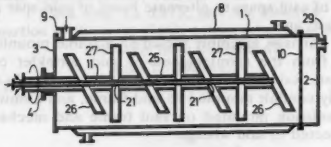
Filed Sept. 30, 1974, Ser. No. 510,772

Claims priority, application Switzerland, Sept. 28, 1973, 13982/73

Int. Cl.² B02C *17/18*

U.S. Cl. 241—67 **8 Claims**

1. An agitator mill for continuous or discontinuous grinding, dispersion, homogenization and emulsifying of microbial organic and inorganic suspension material, comprising a grinding container having an inlet and an outlet for the material to be ground and including a stirrer shaft rotating therein having a plurality of stirring disks mounted thereon, freely movable grinding elements, and a separation device for separating the ground material from said grinding elements at said outlet from the agitator mill, said stirring disks comprising oblique disks arranged obliquely on said stirrer shaft and radial disks



arranged perpendicularly to said stirrer shaft between said oblique disks.

3,993,255

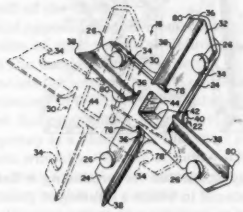
MEAT GRINDER CUTTER BLADE OF THE RADIAL ARM TYPE

Charles W. Hess, Schiller Park, Ill., assignor to Speco, Inc., Schiller Park, Ill.

Filed Feb. 20, 1976, Ser. No. 659,941

Int. Cl.² B02C *18/30*

U.S. Cl. 241—82.5 **6 Claims**

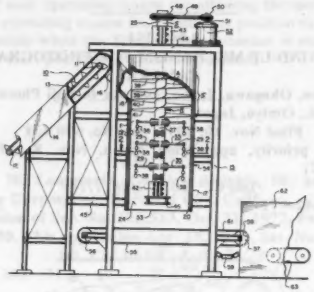


1. In a rotary meat grinder of the type that comprises an elongated tubular grinder casing having a longitudinally extending meat channel therein, a meat-impelling worm rotatable within said channel and effective upon rotation thereof to impel meat chunks rearwardly through the channel, a grinder plate extending across the rear end of the channel and having throughout substantially its entire area transverse perforations of uniform diameter, and a cutter assembly connected to the rear end of said worm, adapted for conjoint rotation with said worm and shearing cooperation with said grinder plate, and including a spider-like blade holder having a central hub portion and a series of backing arms projecting radially therefrom, the improvement which comprises a hardened metal cutter blade constituting another part of the cutter assembly, formed of flat metal stock, mounted against the rear side of the blade holder, and shaped commensurately to said blade holder so as to include a central hub portion which lies flat against the hub portion of the blade holder, and, in addition, radial arms having trailing portions which lie flat against said radially projecting backing arms, and also having leading edge regions which extend rearwardly and outwardly from said trailing portions and constitute knife blades, the distal or outer edges of said knife blades being flat and constituting shearing edges which bear coextensively against the forward face of said grinder plate for shearing cooperation with the perforations in the plate, said knife blades presenting in the immediate vicinity of said shearing edges and on the leading sides thereof flat areas which, during sweeping motion of the knife blades around the forward face of said grinder plate, impel the sheared meat fragments in advance thereof for subsequent passage rearwardly through directly preceding perforations in the grinder plate in the immediate vicinity of said shearing edges under the impelling influence of the oncoming meat chunks in said channel.

3,993,256
WASTE MANGLER SYSTEM AND STRUCTURE

John C. Brewer, Salt Lake City, Utah, assignor to Garbalizer Corporation of America, Salt Lake City, Utah

Filed Aug. 28, 1975, Ser. No. 608,716
Int. Cl.² B02C 13/16
U.S. Cl. 241—152 A 9 Claims

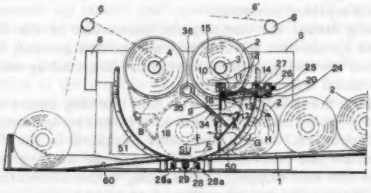


1. Waste mangler structure including, in combination, essentially vertically disposed cylindrical structure, and a rotor journalled for rotation centrally within said cylindrical structure, said rotor having auger means cooperable with said cylindrical structure for forcefeeding received materials downwardly within said cylindrical structure, said rotor also having rigidly affixed cross-arm means disposed beneath said auger means for impact-loosening and reducing compacted materials received from said auger means, and drive means coupled to said rotor for revolving the same, said cross-arm means comprising a series of inner, impact ripper blades and a series of outer flail chains respectively secured to said impact ripper blades.

3,993,257
APPARATUS FOR THE SUPPLY AND AUTOMATIC UNLOADING OF REELS FOR AUTOMATIC WIRE COILING MACHINES

Piero Pietroni, Ascoli Piceno, Italy, assignor to Technofil S.p.A., Ascoli Piceno, Italy

Filed June 10, 1975, Ser. No. 585,677
Claims priority, application Italy, June 17, 1974, 3419/74
Int. Cl.² B65H 67/00
U.S. Cl. 242—25 R 10 Claims



1. An apparatus for the loading and automatic unloading of reels or similar components for coiling machines of the type comprising at least one rotating horizontal axis for receiving a reel for supporting the coil to be formed thereon, comprising:

a slideway for storing thereon and supplying therefrom the empty reels with the reels being so arranged that their axes are parallel to the rotating axes of the coiling machine, said slideway being so inclined as to consent the feed of the reels by gravity to an outlet station of said slideway;

intercepting means for intercepting the reels rolling along said slideway for ensuring that only one reel a time arrives at the outlet station of said slideway;

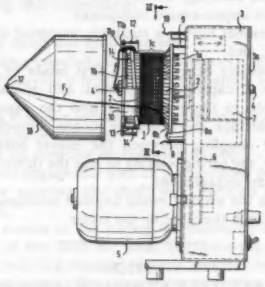
transfer means designed for receiving a single reel leaving the outlet station of said slideway for transferring it from the said outlet station to a lifting station below the rotating axes of the coiling machine and for transferring coiled rolls from the lifting station to said outlet station; and

a rotating lifting means for removal of completed coiled reels from the position coaxial to the rotating axis of the coiling machine to a position of stable rest on said transfer means and for transferring empty reels from said transfer means to a position coaxial with the rotating axis of the coiling machine.

3,993,258
THREAD DELIVERY DEVICE, PARTICULARLY FOR TEXTILE MACHINES

Kurt Arne Gunnar Jacobsson, Ulricehamn, Sweden, assignor to Aktiebolaget IRO, Ulricehamn, Sweden

Filed Apr. 16, 1975, Ser. No. 568,713
Claims priority, application Sweden, Apr. 19, 1974, 7405274
Int. Cl.² B65H 51/20
U.S. Cl. 242—47.12 9 Claims



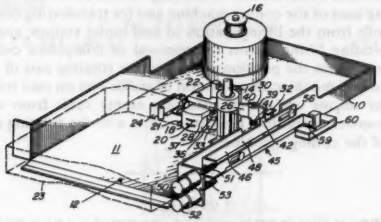
1. In a thread delivery device, preferably for textile machines, having a fixed drum with a rotatable hollow shaft whereby a thread from a storage bobbin is delivered from a first end face of the drum through the shaft to a second end face of the drum, a thread take-up member in the form of a circular take-up disc rigidly mounted on the rotatable hollow shaft adjacent said second end face for the tangential winding of an intermediate supply of thread on to the drum, a thrust ring surrounding said drum for controlling the thread intermediate supply and moving it in the direction toward the first end face of the drum where the thread is drawn off the drum in the direction of and over the second end face and fed to the working elements of the textile machine, the take-up disc having a thread guide in the vicinity of its edge, the improvement comprising an entire annular flange arranged on the take-up disc on the inside of the thread guide, said flange being substantially perpendicular to said disc and projecting towards the drum, said flange being concentric with a section of said drum which is positioned adjacent to the second end face.

3,993,259

FRONT DRIVE FOR A REVERSIBLE TAPE CARTRIDGE

Melvin Arthur Lace, Prospect Heights, Ill., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Mar. 31, 1975, Ser. No. 563,875
Int. Cl.² B65H 17/48
U.S. Cl. 242—55.19 A 15 Claims



1. A drive mechanism in a tape cartridge and tape player combination including

the cartridge having a base portion and front wall, a pressure roller rotatably mounted to the base and accessible through an access in the front wall, tape in the cartridge driven via pressure roller rotation,

the tape player having a base portion and cartridge receiving cavity, a cylindrical capstan located in the player base and rotatably driven from a motor actuated flywheel, the capstan located to drivably engage the pressure roller of a received cartridge through the cartridge front access,

wherein the improvement comprises

a thrust member having a rotatably mounted idler wheel at one end, and

actuating means operable in a first mode to position the idler out of capstan engagement, and operable in a second mode to force the idler into the capstan-pressure roller interface, the actuating means comprising a spring member coupling between the player base and thrust member, the spring tending to bias the thrust member out of capstan engagement,

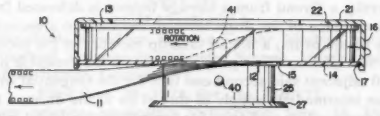
whereby in the second mode capstan rotational drive couples through the idler to the roller.

3,993,260

SELECTIVELY UNWINDING FILM REEL

William Arthur Bauer, Sr., 53 B-Bar-B, Quarry Road, Amherst, Ohio 44001

Continuation-in-part of Ser. No. 442,758, Feb. 14, 1975, abandoned. This application Nov. 10, 1975, Ser. No. 630,209
Int. Cl.² B65H 17/48
U.S. Cl. 242—55.18 5 Claims



1. A reel assembly for flexible strip material comprising:

a hub with a radial flange at one side,

an annular cover adapted to enclose said hub and a length of strip material wrapped thereon,

a free annular side plate on the opposite side of said hub from said radial flange said plate defining a central opening and being adapted to seat in said cover,

a film extraction drum slidably received within said hub for axial movement between a retracted position within said hub and an axially extended position, and

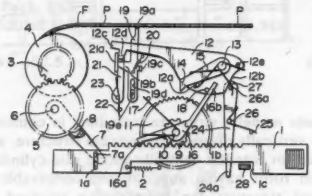
anchoring means on said film extraction drum extending through said hub and connectable to the tail end of the strip wound on said hub whereby when said film extraction drum is pulled axially outward to its extending position it slides the tail end of said strip wrapped on said hub away from said hub and permits the strip to be fed through the central opening in said side plate from the inside out.

3,993,261

FILM WIND-UP MECHANISM FOR PHOTOGRAPHIC CAMERA

Seizi Asano, Okegawa, Japan, assignor to Fuji Photo Optical Co., Ltd., Omiya, Japan

Filed Nov. 10, 1975, Ser. No. 630,431
Claims priority, application Japan, Nov. 8, 1974, 49-135234[U]
Int. Cl.² G03B 1/08, 1/14
U.S. Cl. 242—71 2 Claims



1. A film wind-up mechanism for a photographic camera wherein a film having one perforation per frame is used comprising:

a film wind-up member movable between a start position and an end position, said film wind-up member being spring-urged to the start position,

film take-up means connected with said film wind-up member for taking up a film in the camera in response to the movement of said film wind-up member from said start position to the end position,

a perforation detecting means urged to be in contact with the surface of the film, said perforation detecting means falling into the perforation and moved in the direction of the film movement when the perforation comes to be in engagement therewith or the friction between the surface of the film and the detecting means exceeds a predetermined value,

blocking means for preventing the film wind-up member from returning to the start position movable between a working position to block the film wind-up member and a non-working position,

stopping means for stopping the movement of the film wind-up member toward the end position movable between a working position to stop the film wind-up member and a non-working position,

operating means connected with said blocking means and said stopping means, said operating means being movable between first, second and third positions, in the first position said blocking means being in the working position and said stopping means being in the non-working position, in the second position both said blocking means and stopping means being in the non-working position, in the third position said blocking means being in the non-working position and said stopping means being in the working position,

engaging means movable from an initial position to an engaging position to stop said operating means in said second position in the course of movement thereof from said first position to said third position and a non-engaging position to allow the movement thereof from the first position to the third position, said engaging means being

associated with said detecting means to be moved from the initial position to the engaging position when the detecting means is moved in the direction of the film movement by the friction between the detecting means and the surface of the film and from the initial position to the non-engaging position when the detecting means falls into the perforation of the film, and

release means provided between said film wind-up member and said operating means for allowing the movement of the operating means from said first position to said third position when the film wind-up member is moved from said start position to said end position.

3,993,262

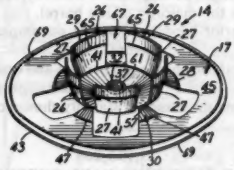
TAPE SPOOL

Michael W. Longworth, Glendale Heights, Ill., assignor to Ampex Corporation, Redwood City, Calif.

Division of Ser. No. 302,513, Oct. 31, 1972, Pat. No. 3,846,530. This application Apr. 18, 1974, Ser. No. 461,914

Int. Cl.² B65H *17/48, 75/18*

U.S. Cl. 242—71.8 **9 Claims**



1. A one-piece plastic spool of substantially uniform cross-sectional thickness formed from a sheet of plastic stock, said spool adapted to support a coil of endless magnetic tape for use in a magnetic tape cartridge, said spool comprising a rotatable disk of predetermined cross-sectional thickness having a single outer annular tape supporting platform for supporting lower edges of the coil of tape, a plurality of hub segments up struck and upstanding from said platform at spaced intervals, a series of openings in said platform, each of said hub segments being aligned with one of said openings, means defining a radially inwardly and upwardly inclined section at the inner portion of said platform for guiding an inner convolution of tape upwardly to said hub segments, said segments being integrally joined to said disk at their lower ends and defining an upstanding hub for guiding the inner convolution of the tape to their upper free ends to pay out the inner convolution of tape, and a central configuration formed on said disk serving as a bearing for rotatably mounting said spool on a spindle post and for engagement with an underlying support surface of a tape cartridge, said central configuration having the same cross-sectional thickness as said disk and comprising a downwardly and radially inwardly extending disk-shaped annular section extending from said hub segments, and an upwardly extending cylindrical sleeve of the same cross-sectional thickness as said disk joined to the radially inner end of said disk-shaped annular section and providing an internal bearing surface serving as the bearing for rotatably mounting said spool on a spindle post.

3,993,263

FISHING REEL

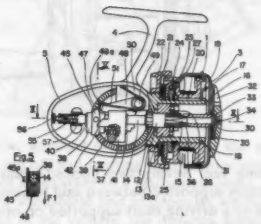
Jean Paul Lemery, Cluses, and Gaston Pithois, Marnaz, both of France, assignors to Garcia Corporation, Teaneck, N.J.

Continuation of Ser. No. 401,454, Sept. 27, 1973, abandoned. This application Apr. 11, 1975, Ser. No. 567,106

Claims priority, application France, Oct. 2, 1972, 72.034840

Int. Cl.³ A01K *89/00*

U.S. Cl. 242—84.21 R **29 Claims**



1. A fishing reel comprising:

a casing;

a normally fixed line spool thereon;

a shaft passing coaxially through said spool, into said casing, the shaft having a front end portion and a rear end portion;

a manually shiftable winding cup fixed coaxially on the front end portion of the shaft;

a line pick-up member on the winding cup;

crank means engageable with an intermediate portion of the shaft for rotating the shaft with the cup and pick-up member;

mounting means in the casing for mounting the rear end portion of the shaft for axial displacement of the shaft with the winding cup and pick-up member relative to the spool between a first forwardmost casting position, a second intermediate reeling-in position and a third rearmost position, in which first position the cup and pick-up member are disposed in front of the spool whereby the spool is uncovered for unreeling a line, by casting without engagement of the line with the pick-up member, and in which second position the pick-up member is disposed over the spool for guiding and winding the line onto the spool in response to actuation of said crank means;

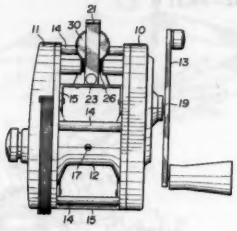
spring means for axially urging the shaft and winding cup in a direction from said third rearmost position towards said first forwardmost casting position; and

locking control means in said casing, comprising locking means for releasably locking the shaft and cup against the action of said spring means in said second position, when the shaft and cup have been manually shifted from the first forwardmost casting position to the second intermediate reeling-in position, and means for disengaging said locking means in response to movement of the shaft and cup from said reeling-in position into said third rearmost position to the first forwardmost casting position under the action of said spring means, the winding cup being accessible for manually moving it from the second intermediate reeling-in position to the third rearmost position and for manually holding and guiding line thereon in said first forwardmost casting position.

3,993,264
FISHING REEL

Kiyohide Kamikawa, Osaka, Japan, assignor to Shimano Industrial Company, Limited, Osaka, Japan

Filed Apr. 28, 1975, Ser. No. 572,313
Claims priority, application Japan, May 10, 1974, 49-53402
Int. Cl.² A01K *89/04*
U.S. Cl. 242—84.41 7 Claims



1. A fishing reel having two opposite housings, a spool axially rotatably supported between said housings and a crank handle fixed to a driving shaft supported on one of said housings so that said crank handle rotates the spool through said driving shaft for winding a fishing line thereon, comprising:

a. a subordinate spindle which is axially rotatable supported between both said housings in advance of the spool in the direction of draw-out of the fishing line, said subordinate spindle being roatable by operation of said crank handle,

b. a drive transmission at the middle portion of said subordinate spindle,

c. a rotary member in mesh with said drive transmission, said rotary member being rotatable around an axis substantially perpendicular to the axis of the subordinate spindle;

d. a movable line guide with a guide bore for guiding the fishing line therethrough, said line guide being provided at one side of said rotary member, said bore being reciprocable substantially axially of said spool, said line guide having at a middle portion thereof a slot extending in a direction perpendicular to the direction of movement of said line guide; and

e. a first pin located off center of said rotary member, said first pin extending from one side of said rotary member towards said slot and entering into said slot at the tip of said first pin, said first pin revolving around the axis of said rotary member when said rotary member rotates so that the tip of said first pin is slidable within said slot to reciprocate said line guide.

3,993,265
PLASTIC BOBBIN OR QUILL

Robert F. Parks, Greenville, S.C., assignor to Steel Heddle Manufacturing Company, Greenville, S.C.

Filed Mar. 17, 1975, Ser. No. 558,951
Int. Cl.² B65H *75/08*, *75/18*
U.S. Cl. 242—118.32 4 Claims

1. A quill of circular cross section for holding a supply of yarn wound thereon in overlapping layers having an elongated barrel and an enlarged butt end integral with said barrel, said butt end having spaced circumferential grooves provided thereon for accommodating retaining rings, said barrel being tapered from adjacent said butt toward the tip end thereof, the improvement comprising:

said entire quill being molded of a mixture of a thermoplastic material susceptible to softening and melting at high temperatures and a blowing agent which generates a gas for forming a cellular plastic material having microscopic bubbles when heated above a predeterined temperature,

said barrel having a solid portion extending from the tip end thereof towards said butt,

a dense exterior hardened surface provided on said barrel and said butt,

a less dense interior cellular core extending through said solid portion of said barrel characterized by said microscopic bubbles retained therein,

an axial bore extending through said butt of said quill extending toward said tip and terminating in said barrel, said bore extending into said barrel a distance less than half the length of said barrel whereby said solid portion comprises the majority of the barrel,

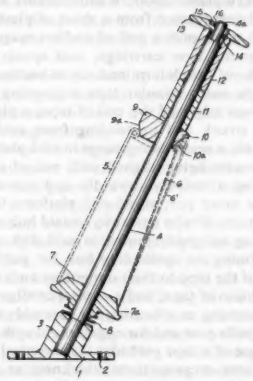
a dense interior hardened surface encompassing said axial bore,

said dense exterior hardened surface and said dense interior hardened surface providing axial support which aids in maintaining dimensional stability thus avoiding warping.

3,993,266
DEVICE FOR FASTENING YARN BOBBINS IN LOOMS

Emilio Llovet Ricart, Roger de Flor Street 16, Mataro, Spain

Filed Dec. 4, 1975, Ser. No. 637,770
Claims priority, application Spain, Dec. 17, 1974, 433013
Int. Cl.² B65H *49/02*; D03J *5/08*
U.S. Cl. 242—130 10 Claims



1. An arrangement for fastening yarn bobbins in looms comprising, in combination, a support fastenable to a loom plate; a bar member joined at one end to said support for receiving a bobbin; a lower ring-shaped member in proximity of said support and axially movable on said bar member for holding one end of said bobbin; an upper ring-shaped member

with predetermined tapered peripheral surface for bearing against the other end of said bobbin, said upper ring-shaped member being axially movable on said bar member; locking means on the other end of said bar member for locking to said bar member to retain said bobbin with lower and upper ring-shaped members on said bar member; and elastic means between said support and lower ring-shaped member for applying spring action to for said upper and lower ring-shaped members against the respective ends of the bobbin, said upper ring-shaped member being forced against said locking means by said elastic means.

3,993,267

FISHING REELS

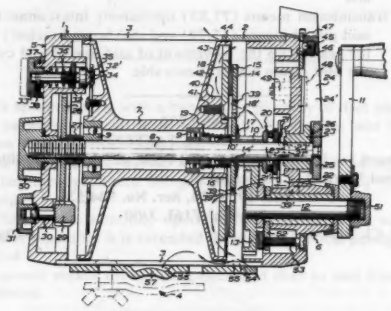
Åke Eugen Murvall, Svangsta, Sweden, assignor to ABU Aktiebolag, Svangsta, Sweden

Filed Sept. 17, 1974, Ser. No. 506,794

Claims priority, application Sweden, Sept. 24, 1973, 7312950

Int. Cl.² A01K *89/02*

U.S. Cl. 242—217 **8 Claims**



1. A fishing reel comprising means serving as a support for a rotatably mounted spool having radially protruding end walls, a rotatable fan wheel having substantially radial vanes and air flow channels therebetween, a crank and a transmission for rotating said spool, said transmission comprising a sliding clutch arranged between said crank and said spool and including control means and first and second coupling disks, said first coupling disk being mounted to be rotated together with said spool and said second coupling disk being mounted to be driven by said crank shaft and said first and second disks being relatively movably mounted to be brought together into controllable frictional engagement by said control means, wherein said first coupling disk is supported by said rotatable fan and forms together with said radial vanes and said channels open ended, substantially radially extending flow passages, said first coupling disk having air inlet means in communication with the radially inner ends of said open ended flow passages and said fan wheel with said first coupling disk being supported by one of said spool end walls between said spool and said second coupling disk for sucking air through said air inlet means of said first coupling disk and throwing air outwardly in said flow passages between said vanes in cooling contact with the side of said first coupling disk facing said fan wheel.

3,993,268

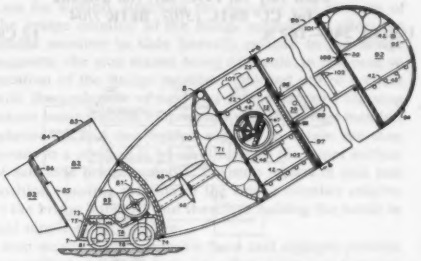
BALLOONED, STOL AIRCRAFT

Alvin Edward Moore, Manini Way, Diamondhead, Rte. 1, Bay St. Louis, Miss. 39520

Filed May 19, 1975, Ser. No. 578,618

Int. Cl.² B64C *1/34*

U.S. Cl. 244—5 **21 Claims**



14. A vehicle, adapted to move through the atmosphere, capable of taking off and landing with its fore-and-aft axis at a steep angle of inclination to a horizontal plane, including:

a transparent windshield and rectangular windshield frame in the nose of the vehicle, the distance between at least two opposite portions of said windshield frame being less than any distance across the longitudinal axis of the vehicle at its middle part;

a tubular body frame comprising: numerous elongated tubes arranged in an assembly around the longitudinal axis of the vehicle, each of said tubes having sealed tube-end portions; a plurality of tube-supporting elements within said assembly, extending transversely to said tubes; and means fastening said tubes to said tube-supporting elements; part of the forward portions of said body-frame tubes curvingly extending toward said axis and to said windshield frame, and part of the forward portions of said body-frame tubes curvingly extending outward from said axis and to said winshield frame.

3,993,269

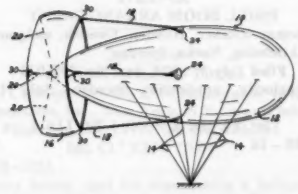
TOROIDAL TAIL STRUCTURE FOR TETHERED AEROFORM BALLOON

Edward Lewis Crosby, Jr., Indialantic, Fla., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Dec. 18, 1975, Ser. No. 642,048

Int. Cl.² B64B *1/50*

U.S. Cl. 244—33 **5 Claims**



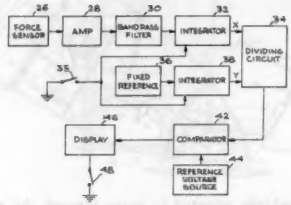
1. In combination with a tethered aeroform balloon, a tail structure comprising: an inflatable toroidal structure having a symmetrical airfoil cross-sectional shape; a first means connected between said toroidal tail structure and said balloon for supporting the drag loads on said tail structure, a second means connected between said toroidal tail structure and said balloon for supporting the weight of the tail structure and aerodynamically induced forces on said tail structure; means within said toroid for maintaining the symmetrical airfoil

shape of the tail structure; means, mounted on said toroidal structure for inflating the tail structure.

3,993,270
SLIPPERY WHEEL DETECTOR

Bernard G. Gallacher, San Francisco, Calif., assignor to Southern Pacific Transportation Company, San Francisco, Calif.

Filed July 16, 1975, Ser. No. 596,462
Int. Cl.² B61L *13/02*; B61K *7/04*
U.S. Cl. 246—182 A **12 Claims**



1. A freight car slippery wheel indicator for indicating whether a retarder can adequately retard a freight car having wheels comprising

retarder means for resiliently gripping a wheel of a freight car as it is rolled through said retarder means,

transducer means attached to said retarder means for generating a load signal representative of the load applied to said retarder means as a result of friction between said retarder means and a freight car wheel which is grasped thereby and

means responsive to said load signal for indicating whether said wheel is too slippery to be adequately retarded by a retarder.

9. A method of indicating whether a wheel of a freight car can be adequately retarded by a retarder having a pair of spaced shoes between which a freight car wheel passes, said shoes being resiliently biased toward one another with a predetermined pressure to apply pressure to said wheel as it passes therebetween, said method comprising

generating a signal representative of the load applied to said retarder as a result of the friction between said retarder shoes and the wheel of a freight car passing therethrough,

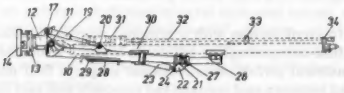
measuring said signal to determine whether or not it is representative of a predetermined acceptable load, and

producing an output when said signal is indicative of a non-acceptable load.

3,993,271
DRILL BOOM ARRANGEMENT

Erich Voldemar Kimber, Handen, Sweden, assignor to Atlas Copco Aktiebolag, Nacka, Sweden

Filed July 3, 1975, Ser. No. 592,931
Claims priority, application Sweden, July 11, 1974, 7409106
Int. Cl.² E21C *9/00*, *5/08*, *11/00*
U.S. Cl. 248—16 **15 Claims**



1. A drill boom arrangement for positioning an elongated rock drilling apparatus (31) to different drilling positions with respect to a support (14) and for drilling blast holes of a cut in the central region of a rock surface to be worked, a drill bit being operatively connected to said rock drilling apparatus (31), comprising in combination therewith:

a drill boom (10),

a boom bracket (12),

substantially horizontal pivot means (11) on said boom bracket (12) for pivotally journalling one end of said drill boom (10) to said boom bracket (12) so as to permit pivoting of said drill boom (10) in a substantially vertical plane, said one end of said drill boom (10) being the inner end thereof,

a boom head (21) carried by said drill boom (10) at the outer end thereof, said rock drilling apparatus (31) being adjustably supported on said boom head (21), and

positioning means for positioning said boom bracket (12) and drill bit laterally to both sides of the center of said support (14), said positioning means comprising

guiding means (55,56) on said support (14) for slidably supporting said boom bracket (12) relative to said support (14) in the latitudinal direction of said rock drilling apparatus (31), and

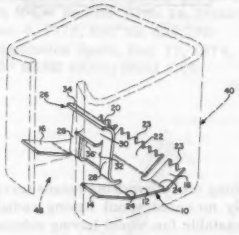
power means (15,70) for moving said boom bracket (12) along said guiding means (55,56), said power means comprising a hydraulic cylinder-piston assembly, either one of the cooperating cylinder and piston of said assembly being movable relative to said support (14), and

transmission means (77,83) operatively interconnecting said power means (15,70) and said boom bracket (12) for gearing up the movement of said one of said cylinder and piston which is movable.

3,993,272
SHEET METAL FASTENER

Richard Jay Lindeman, Elmwood Park, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

Filed Dec. 19, 1974, Ser. No. 534,536
Int. Cl.² F16L *3/00*
U.S. Cl. 248—73 **4 Claims**

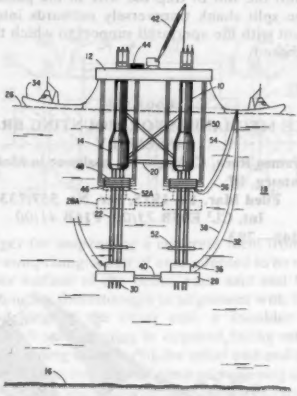


1. A one-piece sheet metal clip adapted to be mounted in a channel member open along one side in an axial direction thereof, said clip including a substantially planar base, a pair of legs each connected intermediate the extremity of the leg to opposite sides of said base, each leg spaced from the base other than at its point of connection and each leg having its opposite extremities extending beyond the edges of the base joining said opposite sides, said legs being capable of flexing independently whereby said clip is maintained in oriented relationship to said channel member in spite of surface irregularities therein, an apertured retaining arm extending angularly out of the plane of said base, said retaining arm including a pair of side elements extending from said base and a transverse limb connecting said elements, each of said legs being provided at their opposite ends with a bighting edge for engaging opposed walls of said channel member and adapted to locate the base generally transversely of said channel member and said aperture in the retaining arm in accessible relationship relative to the opening in said channel.

3,993,273
SPACERS FOR VERTICALLY MOORED PLATFORM RISER BUNDLES

John Thomas Dade, Houston, Tex., assignor to Standard Oil Company (Indiana), Chicago, Ill.

Filed July 28, 1975, Ser. No. 599,907
Int. Cl.² E02B *17/06*
U.S. Cl. 61—88 6 Claims



1. A spacer for use with a bundle of a plurality of riser pipes used between a vessel floating on a body of water and the bottom thereof which comprises:

a. a frame means having a plurality of vertical passages therethrough, there being a passage for each said riser pipe;

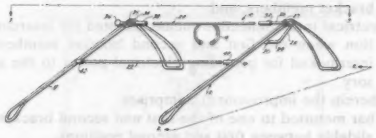
b. first means remotely operable for centering each said riser pipe after it is extended through its vertical passage; and

c. second means for securing each said riser to said frame means.

3,993,274
BABY BOTTLE HOLDER

Mary Jo Jansen, 1513 Chalgrove Drive, Corona, Calif. 91720

Filed Aug. 27, 1975, Ser. No. 608,151
Int. Cl.² A47D *15/00*
U.S. Cl. 248—107 9 Claims



1. A device for holding a baby bottle having a nipple in a position for feeding a baby, the device comprising:

a pair of spaced apart bridge supports for extending above the ground, the bridge supports having an upper surface and an undersurface;

an elongated bridge member extending transversely between the bridge supports, the bridge member having opposite end portions thereof attached to the bridge supports to hold the bridge member above the ground;

means on the supported bridge member for holding a bottle in a desired nipple-down position for feeding a baby lying in a prone position under the bridge member;

means for rotatably attaching the opposite end portions of the bridge member to the bridge supports to allow the bridge member to rotate about its axis, rotation of the bridge member normally causing the bottle-holding means to rotate a bottle to a nipple-up position preventing leakage from the nipple of the bottle;

stop means attached to at least one end portion of the bridge member, the stop means being spaced from the axis of the bridge member and being rotatable relative to the bridge supports in response to rotation of the bridge member; and

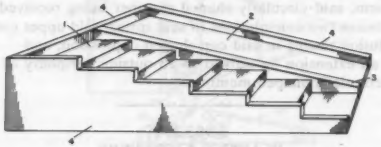
means for slidably attaching the opposite end portions of the bridge member to the bridge supports to allow the bridge member to slide laterally relative to the bridge supports, the stop means being rotatable, in response to rotation of the bridge member, into and out of contact with the underside of said one bridge support, the stop means being slidable transversely with the bridge member relative to said one bridge support to rotate the stop means to a position in which it rests on the upper surface of said one bridge support, the stop means in said rest position resisting rotation of the bridge member relative to the bridge supports and therefore holding the bottle in said nipple-down position;

the stop means being releasable from said engaged position to permit the bridge member to rotate on its axis between said nipple-up position and said nipple-down position.

3,993,275
LADDER LIFTING AND LEVELING DEVICE

Edwin K. Lucas, 202 W. 18th St., Wilmington, Del. 19802

Filed Jan. 3, 1973, Ser. No. 320,722
Int. Cl.² E04G *5/02*
U.S. Cl. 248—188.2 4 Claims



1. A hand portable leveling and supporting device adapted to be readily moved by hand or foot into and out of supporting relationship with the foot of a ladder comprising the combination in one unit of an inclined plane and a series of flat steps separated from said inclined plane by a center ridge adapted to act as a stop for said ladder foot and to prevent slippage of said foot from a step to the inclined plane and vice versa, said series of steps and said inclined plane having on their outside edges a member adapted to act as a stop for said ladder foot and to prevent slippage of said foot from said supporting device.

3,993,276
SPRING HOLDER TOOL

Randall N. Chisolm, Brooklyn, N.Y., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Aug. 20, 1975, Ser. No. 606,201
Int. Cl.² B23P *19/04*
U.S. Cl. 248—352 1 Claim

1. A spring holder tool for maintaining a helical shaped frame support spring of an automobile in a compressed state at a given vertical height, which comprises:

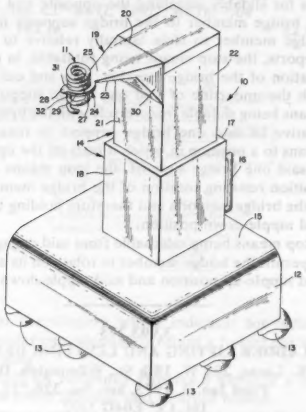
a. a weighted box shaped base;

b. a telescoping elongated rectangularly shaped member having a bottom and a top section, said bottom section perpendicularly affixed to a center of a top of said box shaped base;

c. a handle affixed to a longitudinal side of said bottom section;

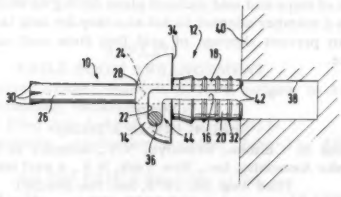
d. a horizontal extension arm affixed to an upper end of a longitudinal side of said top section;

e. a support flange extending between said extension arm and said longitudinal side of said top section;
f. a plurality of casters affixed to a bottom of said weighted base;
g. a circularly shaped member having a cup shaped depression in an upper surface of said circularly shaped member, said circularly shaped member affixed to an outer



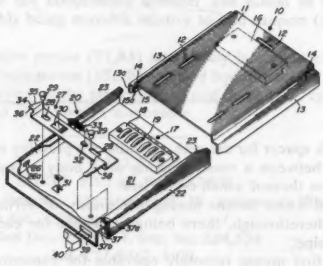
end of said extension arm, wherein said circularly shaped member extends linearly outwardly from said extension arm, said circularly shaped member being received between two convolutions of said spring, said upper convolution resting in said cup shaped depression; and
h. an extension lip affixed to an outside periphery of said circularly shaped member.

3,993,277
PLASTICS FASTENERS
David N. Harley, North Harrow, England, assignor to ITW Limited, Chippenham, England
Filed Apr. 15, 1975, Ser. No. 568,229
Claims priority, application United Kingdom, Apr. 17, 1974, 16796/74
Int. Cl.² F16L *3/08*
U.S. Cl. 248—73 **7 Claims**



1. A one-piece plastics fastener for securing a wire whose ends are not available parallel to a surface of an apertured support, the fastener comprising an axially-extending shank having a laterally extending head formed at one end in which the head extends radially outwards beyond the radially-outer surfaces of the shank to form at least one shoulder for limiting movement, in use, of the fastener into a complimentary aperture in the support to which the shank is to be anchored, the entire length of the shank and an adjacent portion of the head being bifurcated by a common slot, and the head further containing a transversely-extending passage which opens along one side to communicate with said slot and at each end to opposed sides of the head with the opposite side of said passage being closed, whereby a central length of the wire can be passed solely through the slot and into the passage before anchoring the shank to the support, a bore extending through the head and opening into the slot, the bore being capable of receiving a pin which is integrally formed with the head, one end of the pin being secured to the head in axial alignment with the bore by at least one shearable rib, which, in use, extends into the slot to trap the wire in the passage, and to spread the split shank transversely outwards into frictional engagement with the apertured support to which the shank is to be anchored.

3,993,278
LATCH MECHANISM FOR MOUNTING BRACKET ASSEMBLY
William James Race, Chicago, Ill., assignor to Motorola, Inc., Schaumburg, Ill.
Filed Mar. 12, 1975, Ser. No. 557,733
Int. Cl.² E05B *73/00*; F16B *41/00*
U.S. Cl. 248—203 **7 Claims**

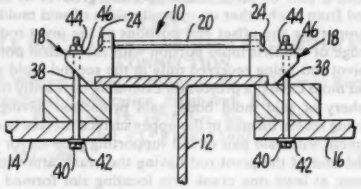


1. Bracket assembly for removably attaching an electrically powered accessory to a support member comprising
a first bracket member adapted to be fixed to the support member,
a second bracket member adapted to be fixed to the accessory,
means for slidably supporting one of the first and second brackets upon the other of the brackets for mounting the accessory to the support member,
means for removably interlocking the first and second bracket members, and
electrical interconnection means adapted for interconnection when the first and second bracket members are interlocked for providing electrical power to the accessory
wherein the improvement comprises
a bar mounted to one of the first and second brackets and slidable between first and second positions,
biasing means urging the bar to the first position,
a latch including an opening in the other of the first and second brackets,
the bar having a tab portion extending laterally therefrom, the tab having a cammed edge for cooperation with a fixed portion of the other of the first and second brackets which forces the bar to the second position against the action of the biasing means as the one of the first and second brackets is moved into mounting relation on the other of said brackets, the biasing means moving the bar to the first position fixedly interlocking the brackets when said brackets reach a fully mounted relation, and
means for moving the bar to the second position for disengaging the bar from the latch to remove the accessory when desired.

3,993,279
TIE ROD SUPPORTED HANGER FOR SUSPENDED CONCRETE FORMS

Jack A. Holt, Belmont, Calif., assignor to The Burke Company, San Mateo, Calif.

Filed Oct. 28, 1975, Ser. No. 625,958
Int. Cl.² E04G 17/16
U.S. Cl. 248—235 **9 Claims**

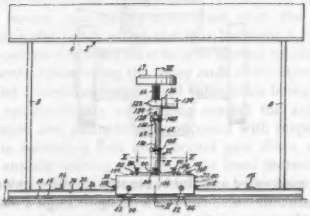


1. A hanger for suspending a concrete form from a beam, said hanger comprising: a pair of ends adapted to be supported on the upper surface of the beam, each said end having an opening extending therethrough in alignment with the corresponding opening of the other end, a shoulder disposed thereon beneath said opening in opposed facing relationship to the corresponding shoulder of the other end and an undersurface disposed thereon intermediate said opening and shoulder, said shoulders and undersurfaces being engageable, respectively, with the upper surface and opposite edges of a beam upon which the hanger is supported; a tie rod extending between said ends and loosely through the aligned openings therein, said rod comprising the only connection between said ends and having enlarged heads disposed for abutting engagement with outer portions of the ends to prevent the ends from separating from the rod; and, suspension means carried by the ends so as to transmit the force of a load imparted thereto as a moment subjecting the shoulders to a compression force and the rod to a tension force.

3,993,280
DRAFTING STOOL

Richard M. Surbaugh, Lake Ozark, Mo., assignor to Paul R. Distler, Lake Ozark, Mo., a part interest

Filed Nov. 10, 1975, Ser. No. 630,301
Int. Cl.³ F16M 11/00
U.S. Cl. 248—405 **5 Claims**

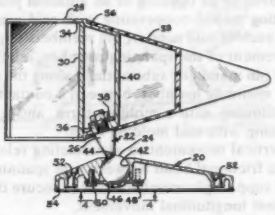


1. A drafting stool comprising:
a. a base carrying floor-engaging wheels operable to support said base for linear movement in either of two opposite directions, and adapted to be placed before a drafting table for movement parallel to the forward edge of said table,
b. a standard disposed above said base and projecting upwardly therefrom,
c. means connecting the lower end of said standard to said base, said connecting means being pivotal to permit inclination of said standard from vertical in a vertical plane parallel to the direction of travel of said stool base, and including resilient means yieldably resisting said pivotal movement,
d. a seat mounted on the upper end of said standard,
e. a reversible prime mover mounted in said base,
f. an operating connection between said prime mover and certain of said ground-engaging wheels, and
g. control means whereby said prime mover may be started, stopped, and reversed, whereby said stool may be caused selectively to move in either direction in its line of travel, said control means including a pair of control devices carried by said base and operable to be actuated respectively by tilting of said standard in respectively opposite directions parallel to the direction of travel of said base, said control devices being operable when actuated to cause respectively opposite operation of said prime mover, whereby the occupant of the seat may actuate either control device by lurching slightly in one direction or the other.

3,993,281
SAFETY SIDE MIRROR FOR VEHICLES

Raymond A. McCarroll, 1725 Newcastle, Grosse Pointe Woods, Mich.

Filed Aug. 29, 1975, Ser. No. 608,928
Int. Cl.³ A47G 1/24
U.S. Cl. 248—481 **6 Claims**

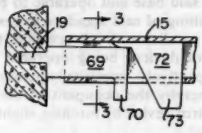


1. In combination with a motor vehicle having a side panel profile that converges inwardly from the lateral extremities thereof to provide a mounting portion, a sideview mirror comprising a mounting bracket secured to said mounting portion, a swivel ball shaft with the ball portion retained in said mounting bracket and the shaft portion extending upward from said mounting bracket, a mirror housing secured to the upper end of said shaft portion, and a mirror glass mounted in said mirror housing to provide a rear view to an occupant of said motor vehicle, said mirror housing and the swivel ball shaft being swivelly movable relative to said mounting bracket so that if any obstruction engages the mirror housing, the mirror housing can be deflected inward of the lateral extremities of said side panel profile, said mirror housing having a rearwardly opening peripheral recess in which said mirror glass is mounted, a lug located immediately forward of said recess to which said swivel ball shaft is secured by a jam nut, and a forward wall extending upward immediately forward of said lug to provide with said mirror glass a relatively small compartment in a fore and aft direction for housing said jam nut and so as to permit relatively free movement of the rearview mirror with respect to the side panel of the motor vehicle, said mirror housing having a recessed portion around its outer periphery facing in a forward direction, and a nose cone of flexible plastics material mounted on said recessed portion and projecting forward of the mirror housing, said nose cone having a fore-and-aft dimension substantially greater than the corresponding dimension of said housing.

3,993,282
CONSTRUCTION FORM SUPPORT MEMBER

Herbert M. Berman, and Ira Hooper, both of New York, N.Y., assignors to Composite Construction Systems, Inc., New York, N.Y.

Division of Ser. No. 313,488, Dec. 8, 1972, Pat. No. 3,900,182. This application Jan. 24, 1975, Ser. No. 543,785
Int. Cl.² E04G 17/00, 25/04
U.S. Cl. 249—24 3 Claims



1. A form support member for supporting a concrete molding form relative to beams and joists in a building construction comprising,

a spanning member having two distal end portions, each of said end portions being at least recessed to define an opening therein,

a support pin member secured in each of said openings and being longitudinally translatable therein between a withdrawn position and an outwardly extending position wherein a pin portion of said support pin member is received in an opening of an adjacent joist and,

activating means cooperating with said spanning member and each of said support pin members to provide vertical movement of the spanning member, relative to said support pin members, substantially along the entire length of said spanning member, between a contacting, supporting relationship with a molding form, and a retracted relationship with said molding form,

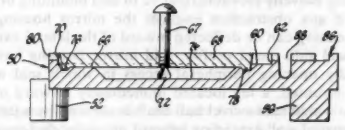
said vertical movement to a contacting relationship effecting a frictional bond between said spanning member and said support pin members so as to secure the pin members against longitudinal movement,

said vertical movement to a retracted relationship permitting easy withdrawal of the pin members from said openings and removal of the form support member.

3,993,283
MOLDING APPARATUS FOR MOLDING A PIVOTABLE PLASTIC FLOW CONTROL DEVICE

Phillip L. Rubright, Berkley, Mich.

Division of Ser. No. 287,293, Sept. 8, 1972, Pat. No. 3,901,964. This application Aug. 25, 1975, Ser. No. 607,854
Int. Cl.² B29C 6/00
U.S. Cl. 249—96 4 Claims

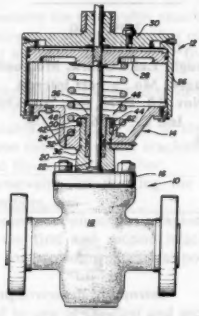


1. Open face molding apparatus for molding a flow control device having a main body portion of rigid plastic material and a sealing portion of elastomeric material on the outer periphery of said main body portion with a pivot rod having a central portion and offset end portions with a crank arm formed on one end portion with the central portion only of the rod embedded in said main body portion, said molding apparatus comprising: a mold body having support means depending from the lower side thereof; an open mold cavity formed in the upper side of said mold body; said mold cavity including a first mold portion having a bottom surface for defining one side surface of said outer sealing portion and an edge portion for defining the outer periphery of said outer sealing portion; said mold cavity including a second mold portion surrounded at least partially by said first mold portion, said second mold portion having a bottom surface for defining one side surface of said main body portion of rigid plastic material; a rim projecting upwardly from the edge surface of said first mold portion; a pair of pivot rod supporting grooves in said rim spaced from each other on opposite sides of said mold cavity for supporting the offset end portions of the pivot rod above the edge of the first mold portion with the central portion of the pivot rod being received only in the second mold portion of said mold cavity; a projection extending outwardly from the periphery of said mold body; said projection having a rod receiving recess formed in the upper surface thereof in coaxial alignment with said pair of rod supporting grooves for receiving the end of the pivot rod having the crank arm supported thereon; at least one crank arm locating slot formed in said projection and communicating with said rod receiving recess, said crank arm locating slot projecting substantially radially from the common axis of said rod supporting grooves and rod receiving recess and at an angle with respect to the plane in which said common axis lies determined by the desired angular relationship between the crank arm and main body portion of the flow control device so that the pivot rod is located both axially and angularly with respect to the main body of the flow control device merely by placement in said rod supporting grooves, rod receiving recess and crank arm locating slot.

3,993,284
CONNECTION OF ACTUATOR CYLINDER HOUSING TO VALVE BONNET

Floyd W. Lukens, Jr., Alvin, Tex., assignor to ACF Industries, Incorporated, New York, N.Y.

Filed June 26, 1975, Ser. No. 590,530
Int. Cl.² F16K 31/363
U.S. Cl. 251—63.6 6 Claims



1. In a gate valve and fluid actuator therefor having a longitudinal movable valve stem extending through a valve bonnet and a fluid actuator cylinder housing mounted on said bonnet, an improved means to mount said actuator cylinder housing comprising:

a. a sleeve extending from said bonnet around said stem,

b. a central opening through said cylinder housing having a collar mounted in said cylinder housing at said opening, said collar being mounted on said sleeve, said bonnet having a means to receive and rigidly support one end of said collar, and said sleeve having an outer end portion extending substantially beyond said collar,

c. means mounted on said sleeve and on said collar to prevent rotation of said cylinder housing relative to said bonnet,

d. a groove around the exterior of said sleeve outer end portion,

e. a split ring mounted in said groove, said split ring being positioned adjacent to the end of said collar, and

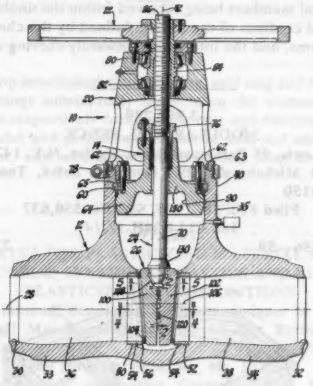
f. ring retainer means rigidly mounted on said sleeve at a position above the ring and extending downwardly alongside an outer peripheral portion of said split ring to prevent outward movement of said ring and retain said split ring in mounted position.

3,993,285

DOUBLE DISC GATE VALVE WITH ENTRAPPED STEM CONNECTION

Richard William Conley, Pittsburgh, Pa., assignor to Rockwell International Corporation, Pittsburgh, Pa.

Filed Aug. 18, 1975, Ser. No. 605,278
Int. Cl.² F16K 25/00
U.S. Cl. 251—86 2 Claims



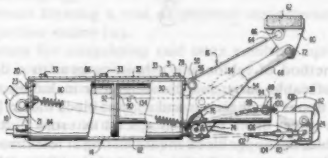
1. A two-piece gate valve comprising: a valve body, end sections on the valve body having a pair of coaxially disposed flow passages, said flow passages having axially spaced inner ends intersecting a valving control chamber, the outer ends of the end sections being connectable to a fluid flow line; a center section on the body perpendicularly intersecting the control chamber; a stem supported on the center section for reciprocative movement along an axis intersecting the control chamber; means operatively associated with the stem for reciprocating the latter along the axis between a raised and lowered position when the stem is held against rotation; annular valve seats surrounding the inner ends of the flow passages adjacent the control chamber, said valve seats being disposed in planes symmetrically converging toward the axis remote from the stem and diametrically opposed with respect to the axis; a gate including first and second gate discs, each disc having an annular seating surface on the front thereof inclined parallel to the opposed valve seats so as to be sealingly engageable therewith in the lowered position; rear surfaces on the discs juxtaposed in assembly parallel to the axis and transverse to the flow line; means associated with the gate discs establishing a predetermined overall width for the gate thereby providing full sealing contact between the annular seating surfaces and the valve seats; tongue and groove means between the discs and the valve body for controlling axial movement of the gate along the axis between the raised and lowered positions; a first groove formed transversely in the rear surface of each of the gate discs radially interior of the valve seat, said first groove having a side surface inclined with respect on the rear surface intersected by a top surface normal to the rear surface; a semicircular groove formed in each gate disc parallel to the rear surface and intersecting the first groove, said second grooves in assembly of the gate defining a circular opening, said first groove in assembly defining a wedge shaped slot having downwardly converging side walls; and an enlarged terminal end in the stem assembly having a first wedge shaped end congruently shaped with respect to the slot and having transverse inclined side surfaces thereon engageable with the transverse inclined surfaces of the slot to effect axial spreading of the discs and forcing the tongues against the sides of the groove such that the torque on the stem is borne thereat so as to hold the stem against rotation, said terminal end engaging the top surfaces of the slot to raise the gate to the closed position and having an intermediate circular portion received within said circular hole whereby the lower end of the stem is fixedly captured by the gate discs notwithstanding fracture from the stem.

3,993,286

LOW PROFILE AIR JACK

Aubrey E. Greene, P.O. Box 26, Ellaville, Ga. 31806, and James D. Anderson, 1000 Riverside Drive, NE., Gainsville, Ga. 30501

Filed Apr. 9, 1976, Ser. No. 675,445
Int. Cl.³ B66F 3/24
U.S. Cl. 254—8 B 6 Claims



1. A low profile air jack which comprises:

a frame;

a horizontally disposed air cylinder carried by said frame and having a pressure chamber therein;

a piston assembly slidably disposed within said air cylinder and having a portion extending beyond said cylinder towards a front end of said frame;

means for moving said piston assembly towards the front end of said frame which includes means for introducing pressurized air into said chamber, said pressurized air exerting a force against said piston assembly in a forward direction;

means for moving said piston assembly towards a rear end of said frame, which includes:

atmospheric venting means for said chamber to reduce air pressure therein, and

spring means for exerting a rearward force in said piston assembly;

means for engaging and lifting a vehicle or other object, said engaging and lifting means being pivotable about a horizontal axis of said frame, said axis being above and orthogonal to the axis of symmetry of said air cylinder;

receiving means carried by said engaging and lifting means; and

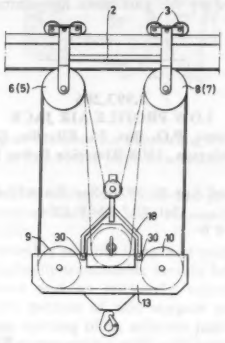
flexible means connected to said projecting portion of said piston assembly and to said frame, and extending over said receiving means, for acting on said receiving means to effect rotational movement of said engaging and lifting means, whereby said load is lifted when said piston assembly is moved in a forward direction.

3,993,287

METHOD AND DEVICE OF REBLOCKING TO AN INCREASED OR REDUCED NUMBER OF ROPE PARTS AT A HOISTING GEAR

Rickard Andersson, Vasteras, Sweden, assignor to Linden-Alimak AB, Vasteras, Sweden

Filed Jan. 29, 1974, Ser. No. 437,559
Claims priority, application Sweden, Feb. 9, 1973, 7318228
Disclosure was also published under second Trial Voluntary Protest Program on Feb. 3, 1976
Int. Cl.² B66D *3/04*
U.S. Cl. 254—188 **7 Claims**



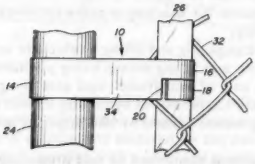
1. A method of reblocking a hoisting gear to a different number of cable parts, said hoisting gear including a lifting cable, an upper block means and a lower block means hanging under the upper block means in at least two rope parts of the lifting cable, the upper block means having at least two spaced apart pulleys, between which one part of the lifting cable runs on the same level as the upper block means, characterized in that the lower block means is lifted up to the upper block means and a portion of the cable running between said two spaced apart pulleys is engaged by a cable engaging means attached to the lower block means and also characterized in that the lifting cable pulled down between said two pulleys on said upper block means is moved manually from said engaging means and placed around a special pulley of the lower block means in reblocking to more cable parts and that the reverse procedure is used in reblocking to fewer cable parts.

3,993,288

BAND TENSIONING DEVICE

Walter L. Pfarr, Jr., Towson, Md., assignor to Anchor Post Products Inc., Baltimore, Md.

Continuation of Ser. No. 538,314, Jan. 3, 1975, abandoned. This application Oct. 10, 1975, Ser. No. 621,435
Int. Cl.² B21F *27/00*
U.S. Cl. 256—47 **3 Claims**



1. In combination, a pair of spaced vertical members and a band tensioning device for holding said pair of spaced vertical members together to keep said pair of spaced vertical members from moving apart from each other, said band tensioning device comprising:

a substantially elongated U-shaped member formed of a flat strip of metal and having a closed end from which spaced legs extend in essentially the same direction, the closed end engaging about one of said pair of spaced vertical members;

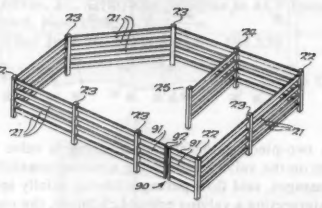
an arm extending outwardly from each of the spaced legs of the U-shaped member, each arm terminating in a inwardly projecting curved end portion, each end portion having a longitudinal axis which extends toward the interior of the U-shaped member and lies along the interior surface of the arm from which said end portion extends, each end portion terminating prior to crossing intersection with the end portion on the other arm, each end portion of said arms having a complementary cut-out section along opposite edges of said arms which allow the end portions to lock about the other of said pair of spaced vertical members after the device is installed between said pair of spaced vertical members, the pair of spaced vertical members being received within the unobstructed spatial confines of the device defined by the closed end, the arms, and the interlocked inwardly curving end portions.

3,993,289

MODULAR RAIL FENCE

Edward Lewis, 95 Parkwood Drive, Snyder, N.Y. 14226, and Edward Michalowski, 293 Hamilton Drive, Tonawanda, N.Y. 14150

Filed Feb. 18, 1975, Ser. No. 550,837
Int. Cl.² E04H *17/14*
U.S. Cl. 256—59 **22 Claims**



1. A modular rail fence construction comprising a plurality of fence posts and rails between and removably supported by said posts characterized in that: both line posts and corner posts of said fence are formed from the same elements; each said post comprises a base, a cap, a shell, and a separate centering and supporting member; said shell is rectangular in cross section and has longitudinally extending slots in two outer side faces thereof and together with said base forms a composite member fitting around said centering and supporting member; each of said rails is provided with mounting means extending into one of said slots in each of a proximate pair of said posts and removably secured in said slots, and separate rail spacing members are provided in said slots.

3,993,290

MANUALLY OPERATED AGITATOR FOR THIXOTROPIC SUSPENSIONS

Louis Kovich, 658 30th Ave., San Francisco, Calif. 94121

Filed Oct. 16, 1975, Ser. No. 622,967
Int. Cl.² B01F *9/00, 11/00, 15/02, 13/00*
U.S. Cl. 259—29 **6 Claims**

1. An agitator for facilitating dispensing a thixotropic suspension from a container having small neck aperature and a wall portion disposed remote from said opening and spaced therefrom comprising a rigid enlargement having a diameter

less than said opening, an elongate rod member having a first end fixed to said enlargement and a second end remote from said first end, said elongate rod member having a length less than the distance from said wall portion to said neck opening, and means for securing said agitator to said wall portion, said securing means having a ring rigid with the second end of said

rod, a loop interlinked with said ring, said ring and loop defining openings substantially larger than the diameter of the members respectively forming the ring and the loop so as to afford axial and pivotal movement to said rod and said enlargement, and means for attaching said loop to said wall portion.

3,993,291

APPARATUS FOR PLASTICIZING MATERIAL SUCH AS RUBBER, SYNTHETIC PLASTICS AND LIKE PLASTICIZABLE COMPOSITIONS

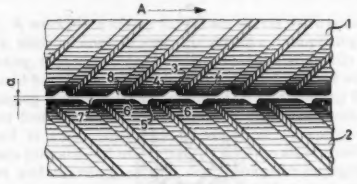
Heinz Brinkman, Bennigsen, Germany, assignor to Hermann Berstorff Maschinenbau GmbH, An Der Breiten Wiese, Germany

Filed Nov. 11, 1974, Ser. No. 522,641

Claims priority, application Germany, Nov. 10, 1973, 2356201

Int. Cl.² B29B *1/10*

U.S. Cl. 259—185 **10 Claims**



1. Apparatus for plasticising rubber and plastics materials, comprising a pair of members defining two spaced apart surfaces, means for rotating at least one of said members, each of said surfaces being formed to present helically extending grooves defined by helically extending intermediate webs, with the webs of each of said surfaces being axially offset relative to each other and being of a width relative to the width of the grooves on the opposite surface so that each web projects on both sides of an opposed groove, said surfaces co-operating with one another such that the material is subjected to constantly changing gap combinations defined respectively by a narrow gap between web surfaces, a medium gap between a web surface and the bottom of an opposed groove, and a wide gap between opposed grooves, thereby achieving thorough kneading and mixing of the material.

3,993,292

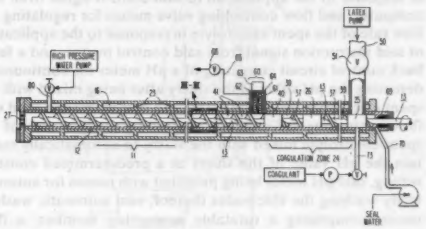
APPARATUS FOR COAGULATING POLYMER LATEX EMULSIONS

Richard H. Skidmore, Strafford, Pa., assignor to W Bar E, Incorporated, Marianna, Fla.

Filed Dec. 13, 1974, Ser. No. 532,525

Int. Cl.² B29B *1/10*

U.S. Cl. 259—193 **13 Claims**



1. In an apparatus for making rubber from a rubber emulsion, wherein an elongated housing is provided in which an elongated worm is driven in rotation, the combination which comprises:

a. means for injecting a latex emulsion under pressure into said housing,

b. means forming a seal of polymer downstream of said injection means (a),

c. means for coagulating said latex emulsion upstream of said seal-forming means (b),

d. means for removing water downstream of said seal-forming means (b), said means maintaining at least a majority of said water in the liquid state,

e. means for continuously extruding coagulated rubber product downstream of said seal-forming means (b)

f. with screw flights running less than full of polymer, and the polymer and the water separate in between said screws, for removal through the means (d).

3,993,293

AUTOMATIC LEACHING SYSTEM FOR HYDRO-METALLURGICAL PRODUCTION OF ZINC

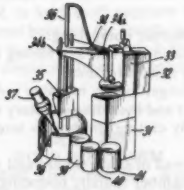
Satoshi Mukae, and Yoshitaka Shiota, both of Simonoseki, Japan, assignors to Mitsui Mining & Smelting Co., Ltd., Tokyo, Japan

Filed June 24, 1975, Ser. No. 589,844

Claims priority, application Japan, June 25, 1974, 49-74748; July 9, 1974, 49-78422

Int. Cl.² C22B *3/02*

U.S. Cl. 266—80 **3 Claims**



1. In an automatic leaching system for the hydrometallurgical production of zinc comprising a neutral leaching section and an acidic leaching section for leaching zinc calcine, the latter producing an overflow acidic leaching solution which is mixed with the calcine to obtain a slurry, the improvement which comprises a fee..-forward circuit comprising means for

detecting the feed rate of the calcine supplied to said neutral leaching section, means for detecting the flow rate of a spent electrolyte supplied to said neutral leaching section, an electronic computer connected to said feed rate detecting means and said flow rate detecting means to make necessary computation in response to the application of the signals representative of the detected feed rate and flow rate from said detecting means thereby generating a control signal, control means connected to said computer to generate an instruction signal in response to the application of said control signal from said computer, and flow controlling valve means for regulating the flow rate of the spent electrolyte in response to the application of said instruction signal from said control means, and a feedback control circuit consisting of a pH meter for continuously detecting the pH value of the slurry after being mixed with the spent electrolyte, said computer, said control means aand said flow controlling valve means controlling the flow rate of the spent electrolyte mixed with the slurry to automatically maintain the pH value of the slurry at a predetermined constant setting, said pH meter being provided with means for automatically washing the electrodes thereof, said automatic washing means comprising a rotatable supporting member, a fluid cylinder supported by said supporting member and having a vertically movable piston rod carrying said electrodes at the lower end thereof, a plurality of tanks including at least a measuring tank provided with an agitator, a first water washing tank, a chemical washing tank and a second water washing tank disposed in the above order beneath the moving path of said electrodes of said pH meter upon the vertical actuation of said piston rod and rotation of said supporting member, so that said electrodes of said pH meter are immersed first in said measuring tank, then successively in said first water washing tank, said chemical washing tank and said second water washing tank to be washed under agitation, and subsequently returned to said measuring tank.

3,993,294

HYDROPNEUMATIC SHOCK ABSORBER

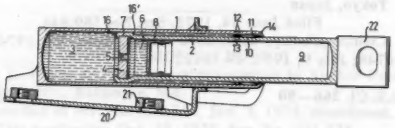
Felix Wössner, and German Schmitt, both of Schweinfurt am Main, Germany, assignors to Fichtel & Sachs A.G., Schweinfurt am Main, Germany

Filed Jan. 20, 1975, Ser. No. 542,163

Claims priority, application Germany, Feb. 1, 1974, 2404706

Int. Cl.² F16F 9/06

U.S. Cl. 267—64 R **6 Claims**



1. A shock absorber comprising:
a. a cylinder having an axis and having an axial end portion open in one axial direction;
b. a hollow plunger axially movable inward and outward of said cylinder and including a unitary tubular member and a disc axially closing the hollow interior of said tubular member,
1. an inner wall of said cylinder and an outer wall of said tubular member radially bounding an annular gap,
2. said cylinder and said plunger axially bounding a chamber in said cylinder,
3. a portion of said tubular member axially adjacent said chamber being radially enlarged to bound said gap in an axially inward direction and guidingly engaging said inner wall during axial movement of said plunger,
4. said tubular member being formed with a shoulder and a radial flange in said hollow interior,
5. said enlarged portion axially connecting said shoulder and said flange,
6. said disc being axially secured between said flange and said shoulder and being formed with a throttling passage connecting said hollow interior with said chamber;
c. annular sealing means radially interposed between said walls, said sealing means being offset from said enlarged portion in said one axial direction and bounding said gap in said one axial direction, said sealing means including, in axial sequence inward of said cylinder, a rigid guide ring, a backing ring, and a resilient sealing ring simultaneously engaging said walls;
d. a body of liquid filling said chamber, said gap, and a portion of said hollow interior;
e. a body of gas under a pressure higher than atmospheric pressure retained in said hollow interior and biasing said liquid outward of said interior through said throttling passage;
f. abutment means on said outer wall abutting against said guide ring in an axial direction and securing said sealing means against axially outward displacement relative to said plunger,
1. said sealing means being exposed to the body of liquid filling said gap,
2. said abutment means including a ring member, said outer wall being formed with a groove receiving a part of said ring member, another part of said ring member projecting radially outward from said groove and being conformingly engaged by said guide ring;
g. a radial flange projecting from said open end portion of said cylinder toward said outer wall; and
h. a resilient annular sealing member radially interposed between said walls, and axially interposed between said flange and said guide ring.

3,993,295

ENERGY STORING DEVICE

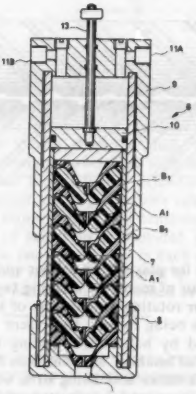
Masuo Suzuki, and Suehiro Takatsu, both of Nagoya, Japan, assignors to Kabushiki Kaisha Takatsu Seisakusho, Japan

Filed Sept. 24, 1975, Ser. No. 616,450

Claims priority, application Japan, May 21, 1975, 50-060531

Int. Cl.² F16F 3/08

U.S. Cl. 267—152 **8 Claims**



1. An energy storing device comprising energy storing bodies formed of hollow cones of polyurethane resin, means for holding the energy storing bodies one above the other, means for compressing and deforming the energy storing bodies whereby the hollow cones are turned inside out, and means for

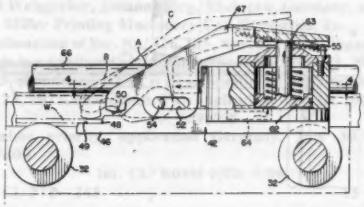
extracting the energy of the deformed energy storing bodies whereby the energy is internally stored through deformation of the energy storing bodies and the stored energy is released through restoration of the deformed bodies and wherein the holding means for each energy storing body is in the shape of an inverted hollow cone having at its top open edge a seat for receiving the large diameter periphery of the energy storing body and having at its bottom end a seat for receiving the small diameter periphery of the energy storing body, each holding means also having an air opening in the bottom end thereof.

3,993,296

WORKPIECE-HANDLING APPARATUS

Dennis Daniels, Bellevue, Wash., assignor to U.S. Amada, Ltd., City of Industry, Calif.

Filed June 30, 1975, Ser. No. 591,534
Int. Cl.² B25B *1/18*
U.S. Cl. 269—24 **1 Claim**



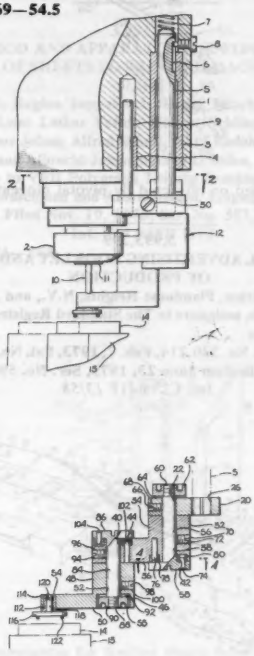
1. A workpiece clamp for planar sheets or structural members, such as angles, I-bars or the like, comprising a clamp housing, first workpiece-engaging means stationarily provided on said housing and having a forward end, second workpiece-engaging means movably mounted on said housing for movement from an extended position in alignment with and opposed in close adjacency to said first workpiece-engaging means forward end to a retracted position more widely spaced from and rearward of said first workpiece-engaging means forward end, and means for moving said second workpiece-engaging means between said extended and retracted positions, said means for extending said second workpiece-engaging means including first fluid powered piston means for moving the second workpiece-engaging means first longitudinally into an opposed aligned position over said first workpiece-engaging means, and second fluid powered piston means for subsequently moving the second workpiece-engaging means toward the first workpiece-engaging means to pinch the workpiece therebetween, said housing including a transverse pin, said second workpiece-engaging means including a longitudinal slot receiving said in, said first fluid powered means including a first piston extendible to move said slot along said pin to extend said second workpiece-engaging means, said second fluid powered means including a second piston extendible upwardly to pivot said second workpiece-engaging means about said transverse pin toward said first workpiece-engaging means, said means for retracting said second workpiece-engaging means including a spring.

3,993,297

WORK-HOLDING APPARATUS

Yoshio Tokunaga, Musashino, Japan, assignor to Citizen Watch Co., Ltd., Tokyo, Japan

Filed Oct. 2, 1975, Ser. No. 618,759
Claims priority, application Japan, Oct. 7, 1974, 49-120362[U]; Apr. 10, 1975, 50-47625[U]
Int. Cl.² B23Q *1/00*
U.S. Cl. 269—54.5 **6 Claims**



1. A work-holding apparatus for press holding from above a workpiece placed on a jig while following horizontal movement of said work, which comprises:

a chain mechanism comprising lever members having ends each rotatably coupled together by shaft supports perpendicular to the work moving surface;

an ascendable guide member biased downwardly by a spring means, said guide member being coupled to one end of said chain mechanism by means of another rotatable shaft support in parallel with said other shaft supports;

a means housed in said shaft supports for setting initial relative positions between the members and for restoring said members to said initial relative positions when said members are displaced from said initial positions by an external force.

3,993,298

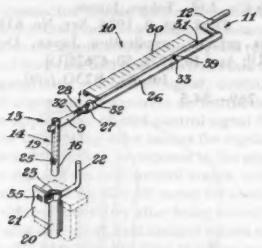
HOLD DOWN ARM

Wilbur Alma Marshall, Rte. 2, Box 96 C, Aurora, Mo. 65605

Filed June 4, 1975, Ser. No. 583,705
Int. Cl.² B23Q *3/02*
U.S. Cl. 269—91 **3 Claims**

1. A hold down arm having a first end and a second end, the first end having a handle means, the second end having an arm support member comprising a rigid leg affixed to and projecting generally perpendicular from said second end of said arm, said leg having a knee and an oppositely disposed foot, said leg

being disposed within and pivotally connected to a tube at said knee, said tube defining an opening through which said foot



may be extended or retracted by pivotal movement of said arm.

3,993,299

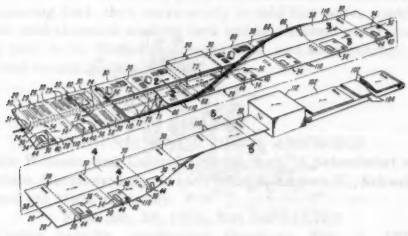
DIRECT MAIL ADVERTISING BOOKLET AND METHOD OF PRODUCTION

William J. O'Brien, Plandome Heights, N.Y., and John Sakal, Dayton, Ohio, assignors to The Standard Register Company, Dayton, Ohio

Division of Ser. No. 330,214, Feb. 7, 1973, Pat. No. 3,899,381. This application June 23, 1975, Ser. No. 589,715

Int. Cl.² B41F *13/58*

U.S. Cl. 270—5 **5 Claims**



1. The high speed method of producing booklets for bulk mailing comprising:

superposing a plurality of continuous strips of paperlike material, there being a first strip of said plurality of continuous strips, there being a second strip of said plurality of continuous strips, each of said first and second continuous strips having substantially the same given width dimension, each of the first and second continuous strips having a longitudinally extending centrally located attachment region dividing the stip into a first portion and a second portion, the first continuous strip having spaced-apart items of repetitive printed material thereupon, each item of repetitive printed material being identical to each of the other of said items of repetitive printed material,

the second strip of said plurality of strips having longitudinally spaced-apart openings in the first portion thereof laterally spaced from the longitudinally extending centrally located attachment region,

attaching said first and second strips together along said longitudinally extending centrally located attachment regions

printing personalized name and address information items upon the second portion of said second strip, each personalized name and address item being in substantial lateral alignment with one of the spaced-apart openings, each personalized name and address information item being different from all other name and address information items,

longitudinally folding the second strip along said longitudinally extnding centrally located attachment region to superpose the first portion thereof over the second portion thereof, each of said openings in vertical alignment with one of said personalized name and address information items so that each personalized name and address information item appears through its respective opening,

longitudinally folding each other strip having said given width dimension along the longitudinally extending centrally located attachment region to complete the formation of a folded web having two substantially planar exterior surfaces and having a width substantially equal to one-half the width of the first strip prior to folding thereof, with the first portions of the first and second strips forming the two exterior surfaces of the folded web,

separating the web into individual sections by severing the web along spaced-apart transverse lines to form booklets.

3,993,300

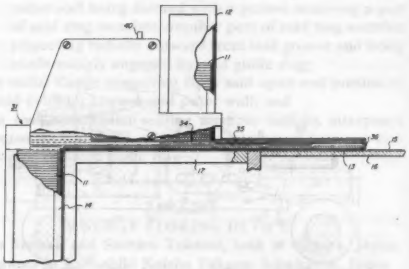
AUTOMATIC FEEDER FOR COMPOSITE COPYING

Anton Hugo Dehner, Buchnerstrasse 34, CH 157 Dielsdorf, Zurich, Switzerland 8050

Continuation of Ser. No. 468,711, May 10, 1974, abandoned. This application Aug. 20, 1975, Ser. No. 605,945

Int. Cl.² B65H *3/24*

U.S. Cl. 271—4 **11 Claims**



1. In a copying machine having a platen for copying information bearing members including a feeder for serially feeding successively said information bearing members image side down to a copying station, said feeder having first and second paths folded relative to one another for guiding the information bearing members toward and away from said copying station in a non-interferring manner, the improvement comprising:

a reciprocable drive means for said feeder having a first motion transmitting member aligned with said first path and a second motion transmitting member aligned with said second path whereby as the drive means is moved in a first direction information bearing members in the first path are driven toward the copying station and as the drive means moves in a second direction information bearing members in the second path are moved away from the copying station, said second motion transmitting member having means to reduce impediment to its travel in the first direction caused by the presence of information bearing members in the second path as it is moved in said first direction.

3,993,301

DEVICE FOR RAISING THE TOP SHEET OF A PILE BY BLAST AIR

Hilmar Vits, Leichlingen, Germany, assignor to Vits-Maschinenbau GmbH, Langenfeld, Germany

Filed June 12, 1975, Ser. No. 586,315

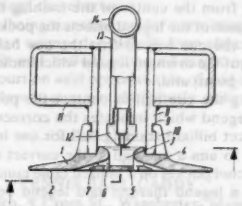
Claims priority, application Germany, June 19, 1974, 2429421

Int. Cl.² B65H *3/14*; B66C *1/02*

U.S. Cl. 271—98 **6 Claims**

1. An apparatus for lifting a top sheet of material from a stack of material which comprises a generally flat foot mem-

ber having an arcuately shaped channel cutout on its lower surface disposed about a centrally positioned baffle plate, said channel being in gaseous communication with an internal conduit, said internal conduit, in turn, being in gaseous communication with a source of gas under positive elevated pressure, said internal conduit being in facing relationship to said baffle plate and being positioned within an exteriorly running conduit running generally parallel thereto which at its end opposed from said baffle is open to the atmosphere.



3,993,302

APPARATUS FOR REGISTERING AND FEEDING SHEETS TO A SHEET FED PRINTING PRESS

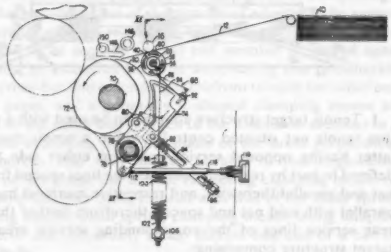
Willi Weisgerber, Johannisberg, Rheingau, Germany, assignor to Miller Printing Machinery Co., Pittsburgh, Pa.

Continuation of Ser. No. 416,285, Nov. 15, 1973, abandoned, which is a continuation-in-part of Ser. No. 361,521, May 18, 1973, abandoned, which is a continuation of Ser. No. 165,521, July 23, 1971, abandoned. This application Apr. 18, 1975, Ser. No. 569,468

Claims priority, application Germany, July 30, 1970, 2037806

Int. Cl.² B65H 9/06, 5/06

U.S. Cl. 271—245 **15 Claims**



1. Apparatus for feeding sheets to a sheet fed printing press comprising,

a feedboard,

a rotatable cylinder mounted adjacent to the delivery end of said feedboard,

a feed roll drive shaft extending transversely across said feedboard adjacent to said feedboard delivery end,

driven feed rolls secured to said feed roll drive shaft for rotation therewith,

a cam member rotatable in timed relation with said rotatable cylinder,

a lever member pivotally connected to a pivot shaft adjacent to said cam member, said lever member having a pivot axis and said lever member being movable by said cam member,

flexible means connected to said feed roll drive shaft and to said lever member,

said lever member being movable by said cam member to oscillate said feed roll drive shaft and said driven feed rolls through a preselected angular displacement in timed relation with said cylinder, and

means to move said lever member pivot axis and rotate said feed roll drive shaft by said flexible means through a predetermined angular distance.

3,993,303

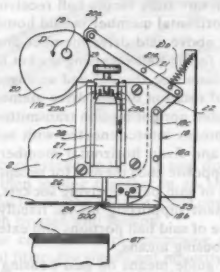
METHOD AND APPARATUS FOR CONTROLLED FEEDING OF SHEETS TO PRINTING MACHINES OR THE LIKE

Rudi Riedl; Regina Jungnickel; Rainer Nitsch, all of Leipzig; Werner Lein; Lothar Vetter; Helmut Schöne; Günter Weisbach; Hans Johne; Alfred Schott, all of Radebeul; Karl-Heinz Förster, and Albrecht Johne, both of Dresden, all of Germany, assignors to VEB Polygraph Leipzig Kombinat fur Polygraphische Maschinen und Ausrustungen, Leipzig, Germany

Filed Nov. 19, 1973, Ser. No. 357,790

Int. Cl.² B65H 7/12

U.S. Cl. 271—263 **3 Claims**



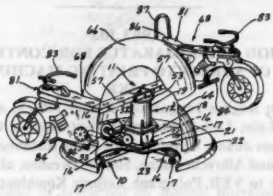
1. In an apparatus for feeding sheets from a stack into a printing or another sheet processing machine, a combination comprising a support for a stack of sheets; lifting means including at least one pneumatic lifting member movable between a first position of engagement with the topmost sheet of the stack on said support and a second position whereby the movement of said lifting member to said second position normally results in the transfer of a predetermined number of sheets from the stack on said support to a scanning station; and transducer means including feeler means for detecting the number of sheets at said scanning station upon each movement of said lifting member to said second position, and indicating means operatively connected with said feeler means and arranged to produce signals whenever the number of sheets at said scanning station deviates from said predetermined number, said feeler means comprising a first feeler, a second feeler, and motor means for moving said second feeler in a first direction away from said first feeler prior to and in a second direction toward said first feeler subsequent to each movement of said lifting member to said second position, said first feeler being movable by said second feeler at least when said scanning station contains more than said predetermined number of sheets, during the last stage of movement of said second feeler in said second direction, said lifting member being arranged to maintain the sheets at said scanning station between said feelers whereby the distance between said feelers upon completed movement of said second feeler in said second direction is a function of the number of sheets between said feelers, said indicating means being arranged to generate signals whenever said distance deviates from a preselected distance corresponding to the thickness of said predetermined number of sheets.

3,993,304

AMUSEMENT RIDE APPARATUS

Claude W. Ahrens, P.O. Box 275, Grinnell, Iowa 50112

Filed July 11, 1975, Ser. No. 595,097
Int. Cl.² A63G 31/16
U.S. Cl. 272—17 8 Claims



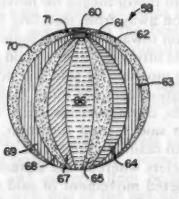
1. An amusement ride apparatus comprising:
a. a base frame,
b. an upright housing means mounted on said base frame,
c. a horizontal rotatable drive member rotatably supported in said housing means having adjacent the periphery thereof an upwardly facing ball receiving socket,
d. a fixed horizontal member in said housing means spaced vertically above said drive member and formed with an upwardly facing ball-receiving socket having an opening in the bottom side thereof and arranged concentric with the axis of rotation of said drive member,
e. an elongated upright motion transmitting member in said housing means interconnected with said rotatable drive member and fixed horizontal member having ball portions at opposite ends thereof for reception within respective ones of said ball-receiving sockets,
f. an occupant supporting means fixedly mounted on the upper one of said ball portions and extended transversely of said housing means,
g. coacting guide means on said housing means and occupant supporting means to prevent horizontal rotational movement of said occupant supporting means while permitting reciprocal vertical oscillation thereof on rotation of said drive member,
h. an occupant seat secured at each end of said occupant supporting means, and
i. means to drive said drive member.

3,993,305

POCKET BILLIARD TRAINING BALL AND METHOD OF TEACHING SIGHTING WHEN PLAYING POCKET BILLIARD

Donald A. Nicholson, Hanson, Mass., assignor to Anthony M. Lorusso, Scituate, Mass.

Filed May 9, 1975, Ser. No. 576,041
Int. Cl.² A63B 37/00
U.S. Cl. 273—2 9 Claims



1. A method of enabling a billiard player to improve his game of pocket billiards comprising the following steps:
a. providing a pocket billiard training ball having a legend formed thereon at least one portion of which when properly oriented on a billiard table lies along an imaginary line which bisects a selected pocket and another portion of which indicates the correct contact point that a cue ball must strike in order to make the selected pocket when one portion of the legend is oriented to lie along an imaginary line which bisects a selected pocket;
b. orienting the training ball so that an imaginary line extending from the center of the training ball and through one portion of the legend bisects the pocket to be made;
c. aiming the cue ball so that the cue ball will strike the portion of the oriented legend which indicates the correct contact point; and,
d. shooting the cue ball to contact the portion of the oriented legend which indicates the correct contact point.

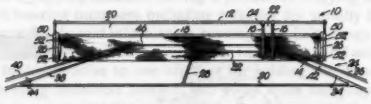
9. A pocket billiard training ball for use in enabling a billiard player to aim a cue ball at the correct contact point to make a selected pocket on a billiard table comprising a billiard ball having a legend thereon said legend being inclusive of twelve segments formed by boundaries separated by an angle 30°, each segment boundary being capable of being oriented so that when placed on a billiard table it lies along an imaginary line which bisects the selected pocket while a segment boundary opposite to and in line with the segment lying along the imaginary line bisecting the pocket to be made indicates the correct contact point that a cue ball must strike in order to make the selected pocket, other segments forming said legend enabling a player to strike the correct contact point on the training ball with the cue ball by object ball displacement by facilitating the shooter's ability to locate an edge of the cue ball which corresponds to the edge of the area of the training ball displaced by the cue ball.

3,993,306

TENNIS TARGET STRUCTURE

Stanley Harold Scott, 3604 W. 95th St., Leawood, Kans. 66202

Continuation-in-part of Ser. No. 488,423, July 15, 1974, abandoned. This application Mar. 26, 1975, Ser. No. 562,132
Int. Cl.² A63B 61/00
U.S. Cl. 273—29 A 5 Claims



1. Tennis target structure adapted to be used with a regulation tennis net situated centrally within a tennis court, the latter having opposed service areas on either side thereof defined in part by respective rear service lines spaced from the net and parallel therewith, and respective rearmost backlines parallel with said net and spaced therefrom farther than said rear service lines of the corresponding service areas, said target structure comprising:
at least one strip of length to substantially span the length of said net;
means for mounting said strip above the upper margin of said net and along the length thereof to define a tennis ball-clearing opening above said net, and for permitting the selective vertical adjustment of said strip to vary the distance between the latter and said upper margin to thereby correspondingly vary the dimensions of said opening,
said strip being adjustable between positions wherein tennis ball service-stroked from either side of said net through said opening will land short of the rear serviceline of the service area on the opposite side of said net, to positions wherein tennis balls groundstroked from either side of said net will land short of the backline on the opposite side of said net;
a plurality of spaced, generally vertically disposed strips extending downwardly therefrom said first-mentioned

strip to present target openings between the vertically disposed strips permitting tennis balls propelled from either side of said net to pass through said target openings and land in selected areas within the playing area of said tennis court on said opposite side of said net; and

means mounting said vertically disposed strips for lateral adjustment thereof in order to vary the dimensions of said target openings therebetween,

said structure being constructed for permitting tennis balls to travel in an unimpeded fashion from either side of said net, through said ball-clearing and target openings, and onto said court on said opposite side of said net, whereby opposing players may simultaneously utilize said target structure.

3,993,307

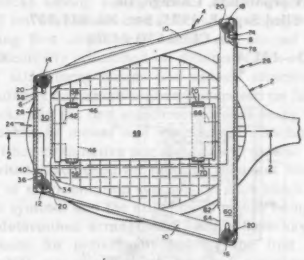
TENNIS BALL CADDY

Giacomo J. Errico, 9 Cross St., Winchester, Mass. 01890

Filed June 30, 1975, Ser. No. 591,411

Int. Cl.² A63B 49/02

U.S. Cl. 273—73 R **8 Claims**



1. A device for holding a can of tennis balls onto a tennis racket press comprising in combination a pair of clamp members, one each being adapted to be removably attached to a respective end of the press; each clamp member comprising a rigid elongate cross-bar of sheet material adapted to lie against and parallel with the respective transverse end member of the press and to be secured to that end member at spaced apart locations, an extension member attached by one end thereof to the cross-bar and extending therefrom toward the other end of the press, and a generally C-shaped clamping means attached to the other end of each of the extension member in a direction extending from the plane of the press perpendicularly thereto, and with its axis parallel to the longitudinal length of the press; the axis of the spring clamping means of one clamp member being coaxial with that of the other spring clamping means; each spring clamping means being adapted to receive and removably retain therein one end of a can of tennis balls.

3,993,308

LAMINATED FIBERGLASS TENNIS RACKET

Herbert R. Jenks, 4600 Numaga Pass, Carson City, Nev. 89701

Continuation-in-part of Ser. No. 11,112, May 5, 1970, abandoned, which is a continuation-in-part of Ser. No. 694,458, Jan. 8, 1968, abandoned. This application Dec. 7, 1973, Ser. No. 422,510

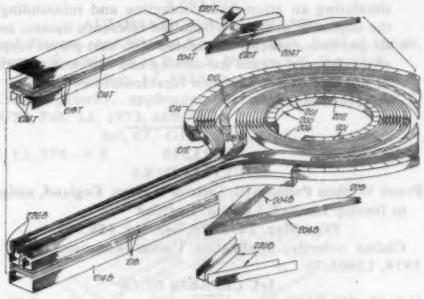
Int. Cl.² A63B 49/10

U.S. Cl. 273—73 F **5 Claims**

1. A tennis racket or the like composed of fibers and resin molded into an integral structure have a head frame portion, a handle portion, and a throat portion:

said handle portion comprising an outer shell having a rectangular cross section and further comprising an upper skin, a lower skin, a pair of outer ribs and a central rib, said ribs extending perpendicularly between said skins in laterally spaced-apart positions, said upper and lower skins bridging said outer ribs, said central rib dividing the interior of said handle into a pair of hollow rectangular longitudinal core members, said central rib comprising an integral common wall of said core members;

said hollow rectangular core members being separated at the end of said handle portion by division along the central axis of said central rib to form said throat portion having divergent arm members, said separated core members thus having upper and lower skins and spaced side ribs, a web section situated between the spaced-apart arm members of said throat portion, said web section being integrally joined to the innermost side ribs of said core members;



said core members extending through said divergent throat section and then joining together in an annular bow to form said head frame, the annulus being completed in the throat portion by said web section;

said rectangular core members comprising a plurality of unidirectional fibers the significant majority of which are oriented in planes parallel to the hitting plane of the racket, said unidirectional fibers being surrounded by fibers forming part of said outer shell wherein said last named fibers are not oriented parallel to the hitting plane;

the core members in said throat and head frame portions comprising rib members consisting essentially of longitudinally oriented unidirectional fibers, the upper and lower skins thereof having multidirectionally oriented fibers;

substantially all of the aforesaid fibers being under tension.

3,993,309

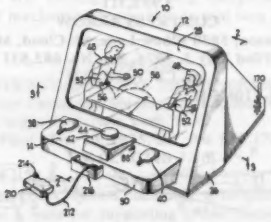
GAME APPARATUS UTILIZING A DISPLAY SCREEN

Howard E. Morris, Arlington Heights; Jeffrey D. Breslow, Highland Park, and Eugene Jaworski, Park Ridge, all of Ill., assignors to Marvin Glass & Associates, Chicago, Ill.

Filed Mar. 4, 1974, Ser. No. 447,779

Int. Cl.² A63F 9/14

U.S. Cl. 273—85 R **26 Claims**



7. In a table tennis game device including a housing having a display screen thereon and control means for producing a

visible path of travel of an object on said screen, an improvement comprising:

a single light source mounted within the housing for producing a beam of light in the visible spectrum;

light directing means associated with said light source for variably directing said beam of light onto the display screen wherein the light image which appears on the screen from said beam defines said object, said light directing means including drive means for moving said light directing means so that said object appears to move on said screen;

a pair of player response reference means defined on said display screen for viewing by the opposing players of the game for simulating reboundable implements for hitting of the object, and selectively operable actuating means associated with each reference means for representatively simulating an attempted contacting and rebounding of the object by and away from the reference means; and

a hit and miss detector associated with said player responsive reference means for sensing and indicating whether or not said object has been representatively "hit" by the reference means.

3,993,310
SHUTTLECOCKS

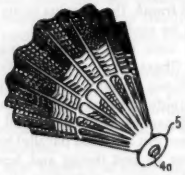
Frank William Popplewell, Saffron Walden, England, assignor to Dunlop Limited, London, England

Filed Mar. 14, 1975, Ser. No. 558,561

Claims priority, application United Kingdom, Mar. 22, 1974, 12805/74

Int. Cl.² A63B *67/18*

U.S. Cl. 273—106 A **7 Claims**



1. An integrally moulded shuttlecock skirt comprising a plurality of diverging stems, said stems defining a substantially frusto-conical structure and the ends of said stems at the convergent end of the skirt being joined together to form an end-ring in the form of a hollow cylinder, said cylinder at its end remote from the stems being closed by an outwardly convex wall and said closed end having a centrally-disposed spigot of a diameter smaller than said cylinder extending in the direction away from the skirt to provide anchorage means for a striking cap.

3,993,311
COMPRESS ARROW

William Johnson, 5830 Elbow Lane, St. Cloud, Minn. 56301

Filed May 3, 1976, Ser. No. 682,531

Int. Cl.² F41B *5/02*

U.S. Cl. 273—106.5 R **10 Claims**

1. A hunting arrow, which comprises:

a first hollow shaft having a forward end and and a rearward end;

an arrowhead mounted to said forward end of said first hollow shaft;

a second hollow shaft having a forward end and a rearward end, said second hollow shaft being slidably fitted over said first hollow shaft and being shorter than said first shaft;

a nock detachably fitted within said rearward end of said second hollow shaft;

a length of high strength line disposed within said first hollow shaft;

means for securing one end of said line to said nock; and

means for securing the other end of said line to said arrowhead, whereby, upon impact with a target, said second shaft will slide forwardly over said first shaft causing said rearward end of said first shaft to drive against and detach said nock from within said second shaft.

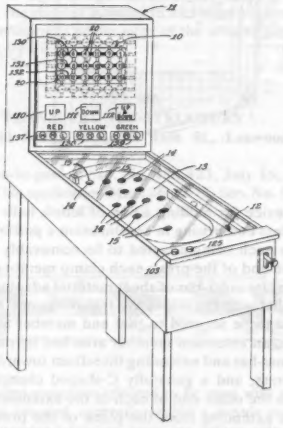
3,993,312
CHANGEABLE DISPLAY APPARATUS

Walter M. Burnside, Waukegan, Ill., assignor to Bally Manufacturing Corporation, Chicago, Ill.

Filed Sept. 8, 1975, Ser. No. 611,127

Int. Cl.² A63D *13/00*

U.S. Cl. 273—121 A **6 Claims**



1. In a changeable display apparatus having a fixed display panel and a shiftable display panel which is movable relative to the fixed display panel,

1. a rotatable cam means operatively connected with a lever arm which supports said shiftable display panel and said rotatable cam means adapted to reciprocably move said lever arm from a center position in generally diametrically opposite directions and returning said lever arm to said center position,

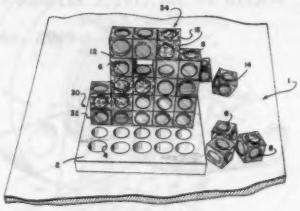
2. locking means associated with said lever arm adapted to restrain movement of said lever arm from said center position in at least one of said opposite directions, and

3. a mechanical release means interposed between said rotatable cam means and said lever arm which allows a cam element incoporated in said cam means to be rotated 360 degrees while said locking means restrains movement of said lever arm from said center position in at least one of said opposite directions; whereby said shiftable display panel is movable in one direction away from a center position and back to center position by a cam which is rotatable in only one direction while said shiftable display panel is restrained from being moved from said center position in an opposite direction.

3,993,313
JIG-SAW PUZZLE EDUCATIONAL GAME DEVICE

Richard Tillotson, EWC 1199, The East-West Center, 1777 East-West Road, Honolulu, Hawaii 96822

Filed Sept. 26, 1974, Ser. No. 509,415
Int. Cl.² A63F *3/00*
U.S. Cl. 273—130 AC 7 Claims

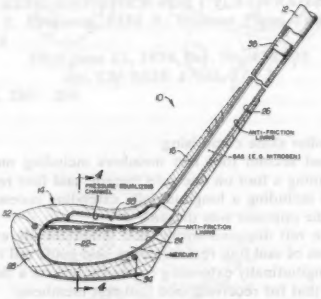


1. Comprehension enhancing apparatus comprising plural cubic blocks having six side faces and engagement means mounted on the blocks on all faces, the engagement means comprising first attachment means and second attachment means selectively positioned on different faces of the blocks, the first attachment means and second attachment means being mutually conjunctive when juxtaposed on faces of adjacent blocks and the first attachment means being repulsive to first attachment means and the second attachment means being neither conjunctive nor repulsive to second attachment means when juxtaposed on faces of adjacent blocks, and a plurality of representation symbols on each block, the representation symbols and the attachment means being organized in a predetermined arrangement, and a base having attachment means for individually holding the first attachment means while not repelling the second attachment means, whereby rows of blocks with interengaged first and second attachment means are arranged on the base with the base attachment means holding the rows by engaging with the first attachment means on individual blocks.

3,993,314
GOLF CLUB

Lance E. Harrington, Westlake, and Thomas Lisa, Studio City, both of Calif., assignors to Thomas Lisa, Studio City, Calif.

Filed Mar. 17, 1975, Ser. No. 559,320
Int. Cl.² A63B *53/08*
U.S. Cl. 273—170 8 Claims

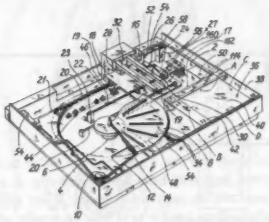


1. A golf club having a head and a shaft; said head having a club face; means forming a sealed cavity having two communicating parts, one of the parts extending along a limited length of said shaft and the other of said parts being located behind and substantially centered at the club face; said cavity part having a flattened teardrop shape with an area that is a substantial fraction of that of the club face, said other cavity part generally paralleling said club face to extend in a substantially vertical plane when the golf club is in its addressed position, the neck of said teardrop cavity part registering with the said one cavity part with the said other cavity part aligned with the axis of the shaft; a pool of mercury only partially filling the cavity; a body of inert gas filling the remainder of said cavity and sealed therein; said other cavity part having a configuration to facilitate flow of mercury between the cavity parts as the club moves between back swing and ball striking positions; said pool of mercury substantially filling the said other cavity part when said golf club is in its addressed position.

3,993,315
AUTOMATIC PHONOGRAPHS

Svend Hansen, and Nicolai Krebs Sorensen, both of Struer, Denmark, assignors to Bang & Olufsen A/S, Denmark

Filed Feb. 14, 1973, Ser. No. 332,496
Claims priority, application Denmark, Feb. 14, 1972, 658/72; Feb. 14, 1972, 660/72
Int. Cl.² G11B *3/36*, *17/00*
U.S. Cl. 274—9 R 40 Claims



1. A phonograph comprising in combination:
a carrier chassis,
a turn table and a tone arm mounted on said carrier chassis,
a main chassis having means for resiliently supporting said carrier chassis,
a turn table driving motor,
tone arm moving means operable to move said tone arm vertically between a raised, inoperative position and a lowered playing position, said tone arm being horizontally movable over a record in both said raised and said lowered position,
play stop detecting means operable to produce a play stop control signal in response to the tone arm reaching an innermost position corresponding to the completion of play of a record,
said play stop detecting means being operatively connected to said tone arm raising means for causing said tone arm to be raised in response to occurrence of said play stop control signal,
said tone arm moving means being energizeable independent of mechanical connection to said turn table.

3,993,316
OVERHEAD SIGNAL PICKUP DEVICE

David William Fairbanks, Monmouth Junction, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Mar. 10, 1975, Ser. No. 557,178
Int. Cl.² G11B *3/36*
U.S. Cl. 274—23 A 15 Claims

1. In a playback system including a turntable rotatably mounted on a base for supporting a disc record; said disc record having a centering aperture and a spiral groove with information recorded therein; said turntable having a centering hub for concentric alignment of said disc record; a support

housing carrying a signal pickup which is subject to positioning in said spiral groove; a lid hinged to said base for supporting said support housing; an overhead signal pickup drive comprising:

bearing means affixed to said lid for supporting travel of said support housing within said lid; said bearing means being so oriented that said travel of said support housing results in a motion of said signal pickup along a path radially disposed relative to the axis of rotation of said turntable;

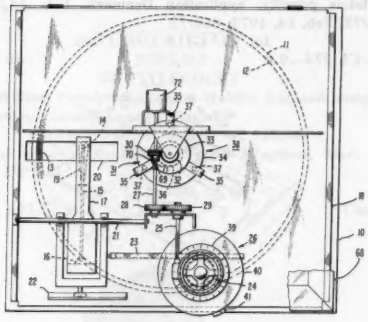
a rack having one end connected to said support housing;

a pinion rotatably mounted in said lid in engagement with said rack;

a drive shaft also rotatably supported in said lid coupled to said pinion;

a wormwheel rotatably mounted in said lid coupled to said drive shaft;

a wormgear rotatably suspended in said lid in engagement with said wormwheel;



a drive plate also rotatably suspended in said lid in engagement with said wormgear; wherein said drive plate is suspended such that when said lid is secured onto said base, the axis of rotation of said drive plate is substantially coincident with the axis of rotation of said turntable;

a centering collar concentrically suspended by a plurality of spring elements from said drive plate; wherein the inside diameter of said centering collar is slightly greater than the outside diameter of said turntable hub permitting a smooth engagement of said collar with said hub when said lid is secured onto said base for playback; and

a plurality of friction pads affixed to said centering collar on the side opposing said drive plate; wherein when said lid is secured onto said base, said friction pads are pressed by said spring elements against the unrecorded surface of said disc record, and thereby transmitting rotational motion of said disc record to said centering collar for causing said travel of said support housing carrying said signal pickup.

3,993,317

CORE CHUCK

Richard Edward Flagg, East Bridgewater, Mass., assignor to Double E Company, Inc., Brockton, Mass.

Filed Dec. 12, 1974, Ser. No. 532,212

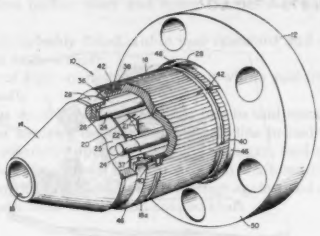
Int. Cl.[2] B23B *31/40*; B65H *17/02*

U.S. Cl. 279—2 R **15 Claims**

1. In a core chuck having a longitidinal axis and comprising radially movable exterior jaw members, means operative in response to a relative rotation between said jaw members and said means to apply a radially outward force to said jaw members, and biasing means for urging said jaw members toward a predetermined radial position, the improvement wherein:

said jaw members define aligned recesses in one of the inner and outer surfaces thereof;

said biasing means comprise a band spring engaging all of said jaw members and disposed in said aligned recesses; and,



at least one of said recesses is provided with spring retainer means preventing removal of said spring from said one recess in a radial direction and permitting movement of said spring relative to said one recess in a circumferential direction, said spring retainer means comprising a stop projecting axially from a said side of said recess, and overlapping and being arranged to engage a radially-facing surface of said spring.

3,993,318

ROLLER-SKATE

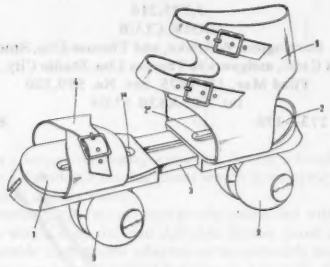
Karl-Heinz Rothmayer, Grosshesselohe near Munich, Germany, assignor to Messrs. Adidas Sportschuhfabriken Adi Dassler KG, Am Bahnhof, Germany

Filed Sept. 23, 1975, Ser. No. 615,990

Claims priority, application Germany, Oct. 3, 1974, 2447330

Int. Cl.[2] A63C *1/26*

U.S. Cl. 280—11.26 **7 Claims**



1. A roller skate comprising:

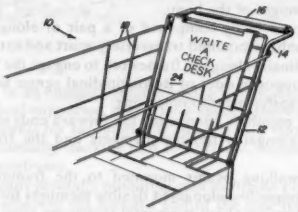
first and second foot rest members including means for retaining a foot on one side thereof, said foot rest members including a longitudinally extending recess formed on the opposite side thereof;

a guide rail disposed within said longitudinally extending recess of said foot rest members, said guide rail including a longitudinally extending recess formed on a side opposite that for receiving said foot rest members;

first and second roller mounting members comprised of an upper plate portion, a downwardly extending web portion and at least one roller mounted to said web portion, said plate portion of said roller mounting members being slidably positioned within said longitudinally extending recess of said guide rail; and

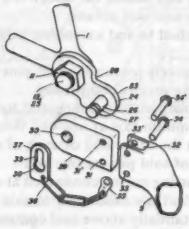
a locking means for selectively and independently fixing the relative position of each of said foot rest members, said roller mounting members and said guide rail.

3,993,319
CHECK WRITING DESK FOR SHOPPING CARTS
Guy C. Day, 203 Pine St., Sweetwater, Tex. 79556
Filed Oct. 3, 1975, Ser. No. 619,454
Int. Cl.² B62B *3/02*
U.S. Cl. 280—33.99 A **6 Claims**



1. In combination with a shopping cart usable in markets and having a frame, wheels supporting the frame, a handle at one end of the frame, and article receptacle means carried by the frame and defined by generally horizontal and upright rod structure to form with the frame a rectangular enclosed basket structure with the top of the basket structure and the handle being at about the same height above the wheels, additional upright and horizontal rod structure forming a separate pivotable vertical partition member inside of and at the end of the basket structure where the handle is located, the pivotable partition member having an uppermost horizontal rod at a slightly higher height than the top of the basket structure, the improvement comprising means for enabling a user of the cart to conveniently write a check at basket top height including a check writing desk member pivotally mounted by pivot means on the uppermost horizontal rod of said pivotable shopping cart partition member for permitting the desk member to be collapsed in a substantially vertical position when the partition member is pivoted to a closed position at the rear of the basket structure and swung to an open substantially horizontal position between the pivot means and the rear top of the basket structure when the partition member is pivoted to an open position within the basket structure for use as a check writing desk.

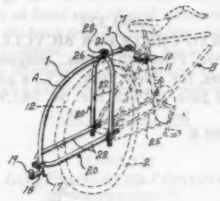
3,993,320
RESILIENT HITCH FOR CYCLE TRAILER
Russell S. Robinson, 3330 N. Webster Place, Tucson, Ariz. 85715
Filed June 13, 1974, Ser. No. 478,935
Int. Cl.² B62K *27/02, 27/12*
U.S. Cl. 280—204 **6 Claims**



1. In combination with a cycle and a two-wheeled trailer to be disposed behind said cycle, said trailer having a tongue extending forwardly of the rear end of the rear wheel of said cycle and laterally displaced to one side of said cycle, a hitch for connecting the forward end of said tongue to one side of said cycle,

said hitch comprising a resilient member having a pivotal connection to one of said cycle and said tongue which provides freedom of movement of said tongue and said trailer about one axis relative to said trailer, the resilience of said member providing freedom of movement of said tongue and said trailer about the remaining two axes relative to said cycle.

3,993,321
BICYCLE HITCH
Rene Cote, 6999a Christophe-Colomb St., Montreal, Quebec, Canada
Filed Aug. 25, 1975, Ser. No. 607,826
Int. Cl.² B62J *39/00*
U.S. Cl. 280—204 **9 Claims**

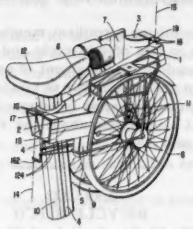


1. A bicycle hitch comprising a curved member subtending substantially a quarter circle and adapted to spacedly surround the top back quarter portion of the rear wheel of a bicycle in the plane of said rear wheel and substantially coaxial therewith, means at the front end of said curved member to removably secure said curved member to a fixed part of a bicycle, hitching means carried by the other end of said member to detachably cooperate with the hitching means of a trailer or the like, a pair of U-shaped fork members to support longitudinally spaced points of said curved member, attaching means carried by the bight portion of said fork members to secure the latter to said curved member, said fork members having legs radially inwardly extending from said curved member, the free end portions of said legs having means for removable connection with another fixed part of said bicycle said attaching means including a clamping member carried by the bight of each fork member and clampable at any point along the length of said curved member to adjustably vary the attachment of said fork members longitudinally of said curved member.

3,993,322
BICYCLE
Reinder Van Tijen, Fazantaan 59, Dieren, Gelderland, Netherlands
Filed Sept. 11, 1974, Ser. No. 505,090
Claims priority, application Netherlands, Sept. 11, 1973, 7312501
Int. Cl.² B62K *15/00*
U.S. Cl. 280—278 **7 Claims**

1. In a folding bicycle having a frame divided into at least two parts, one of which is a front part, the two frame parts being hingeable with respect to one another, the improvement comprising a handlebar system composed of four parts hingeable with respect to each other, two lower parts of said handlebar system being hingeably connected with a short standing beam which on the one side is attached hingeably to the front frame part and on the other side is connected with a front wheel support, alongside which the parts of the handlebar system are foldable downwardly on either side, the length of

said parts of said handlebar system being such that in the folded position the handle grips connected to the upper parts



of the handlebar system come to lie parallel to each other next to the upper edge of the short standing beam.

3,993,323

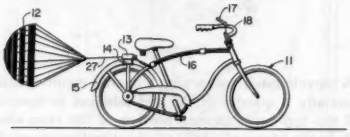
DRAG CHUTE FOR BICYCLE

Stephen E. Lussier, Plymouth, Mass., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed June 2, 1975, Ser. No. 582,991

Int. Cl.² B62J *39/00*

U.S. Cl. 280—289 R **7 Claims**



1. A bicycle attachment comprising a parachute, in combination with container means for holding said chute in a collapsed position, the container configured to conform to the shape of a part of the bicycle such as a rear fender, a clamp for holding the container to the rear fender, tether means for attaching said chute to said container, positive ejection means for ejecting the chute from the container, control means for the ejection means, release means for the control means, whereby the parachute is released from the container and deployed.

3,993,324

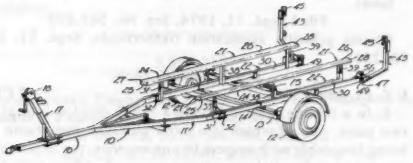
BOAT TRAILER

Lawrence K. Carrick, Spokane, Wash., assignor to Calkins Manufacturing Company, Spokane, Wash.

Filed Aug. 4, 1975, Ser. No. 601,800

Int. Cl.² B60P *3/10*

U.S. Cl. 280—414 R **5 Claims**



1. A boat trailer, comprising:

a wheel supported framework for supporting the weight of a boat and adapted to be moved along by a towing vehicle;

bow securing means mounted at a forward end of the framework for engaging the bow of the boat when held on the trailer in a loaded position and for preventing longitudinal motion of the boat relative to the trailer;

longitudinally resilient hull engaging bunk means movably mounted on opposite longitudinal sides of the framework and having longitudinal areal hull engaging surfaces thereon for conforming to the hull shape of the boat and for evenly receiving the weight of the boat along the entire areal surface;

and weight transfer means mounted between the resilient hull support means and framework for distributing weight carried by the bunk means to selected points on the framework while allowing flexure of the bunk means under the weight of the boat;

said bunk means being comprised of a pair of elongated flexible members mounted transversely apart and extending longitudinally along the framework to engage the boat hull along opposite sides of its longitudinal center line;

said weight transfer means comprising:

upright brace members connecting the forward ends of the respective elongated flexible members and the framework;

longitudinal walking beams mounted to the framework below the respective elongated flexible members for free pivotal movement about horizontal transverse axes;

forward upright supports extending upwardly from forward ends of the beams and pivotally mounted to the elongated flexible members adjacent their longitudinal centers; and

rearward upright supports extending upwardly from rearward ends of the beams and pivotally mounted to the longitudinal flexible members adjacent their rearward ends.

3,993,325

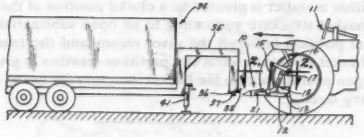
TRAILER COUPLING APPARATUS

Darrell E. Gravett, Rte. 2, Pleasantville, Iowa 50225

Filed Aug. 11, 1975, Ser. No. 603,697

Int. Cl.² B60D *1/00*

U.S. Cl. 280—415 B **6 Claims**



1. A coupling apparatus comprising:

a plate means for supporting a substantial load on a top surface thereof;

slot means formed in said plate means for reception of a coupling shaft of a trailer;

locking means attached to said plate means and being disposed in said slot means for selectively locking said coupling shaft in said slot means;

pin means attached to and extending from each side of said plate means;

means for selectively journaling said pins to a prime mover, said journaling means comprising:

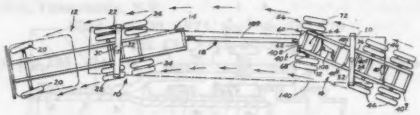
two draft arms pivotally connected to said prime mover along a common axis at one end thereof and having an opening in the other end of each of said draft arms for reception of said pin means; and

a rigid supporting means connected at one end to said pin means and at the other end to said prime mover at a point substantially above said common axis of the draft arms for vertically and laterally supporting said draft arms.

3,993,326
VEHICLE WITH SELF-STEERING TRAILER

Kenneth J. Schmidt, Springfield, Oreg., assignor to General Trailer Company, Inc., Springfield, Oreg.

Filed July 7, 1975, Ser. No. 593,467
Int. Cl.² B62D 53/06
U.S. Cl. 280—426 12 Claims



1. In an elongate vehicle having a steerable front frame and a wheel-supported rear frame spaced rearwardly therefrom, apparatus for automatically steering said rear frame in a path substantially tracking said front frame, comprising,

a subframe,

means pivotally mounting said subframe on said rear frame adjacent the forward end of the rear frame for rotation relative thereto about a substantially upright pivot axis,

a wheel assembly mounted on said subframe for rotation therewith,

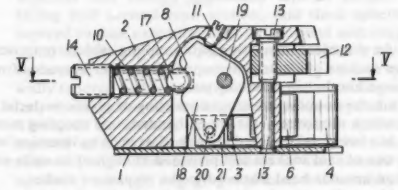
an elongate reach member extending between said front and rear frames pivotally connected at its forward end to said front frame and pivotally mounted adjacent its rear end for swinging in a substantially horizontal plane relative to said subframe and said rear frame, and

connector means operatively connecting said reach member to said subframe for producing turning of said subframe and wheel assembly relative to said rear frame in the direction of swinging of said reach member a selected proportioned degree less than said reach member swings relative to said rear frame, said connector means comprising an elongate proportioning link pivotally connected intermediate its ends to said subframe in a region spaced from said pivot axis, means pivotally connecting one end portion of the proportioning link to said reach member, and means pivotally connecting the proportioning link adjacent its opposite end to said rear frame.

3,993,327
FRONT JAW FOR SAFETY SKI BINDINGS

Herbert Kaineder, Hundsheim, and Josef Svoboda, Schwechat, both of Austria, assignors to Gertsch AG, Zug, Switzerland

Division of Ser. No. 507,469, Sept. 19, 1974, Pat. No. 3,951,423. This application Feb. 5, 1976, Ser. No. 655,475
Claims priority, application Austria, Sept. 26, 1973, 8290/73
Int. Cl.² A63C 9/08
U.S. Cl. 280—625 11 Claims



1. A front jaw in safety ski bindings for holding a ski boot onto a ski, comprising:

base means mounted on said ski and having a pair of horizontally spaced vertical posts fixedly secured thereto;

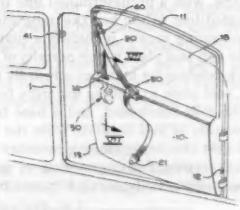
a two-arm lever pivotally mounted on each of said vertical posts for movement between a ski boot engaging and a ski boot releasing position, each two-arm lever having a long arm adapted to engage said ski boot and a short arm, at least one of said short arms having cam means connected thereto and movable therewith, said cam means further including a single cam plate pivotally supported on said base means for movement about a pivot axis and having a contoured edge thereon, said cam plate being pivotally secured to both of said short arms through a pair of pivot axes which are both parallel to said plane defined by said vertical axes of said posts; and

resilient locking means mounted on said base means and consisting of a single elongated spring and a single locking member, the longitudinal axis of said spring being immovably fixed to said base means and extending perpendicular to said pivot axis and to a plane defined by said vertical axes of said posts, said spring resiliently urging said locking member into engagement with said contoured edge of said cam plate, the spacing between said contoured edge and an abutment for said spring becoming smaller as at least one of said two-arm levers is swung from said ski boot engaging position toward said ski boot releasing position, said spring backed locking member resisting a lateral pivotal movement of said two-arm levers toward a ski boot releasing position.

3,993,328
VEHICLE DOOR MOUNTED CONTINUOUS LOOP SYSTEM

Cyril Henderson, Woodland Hills, and Akira Tanaka, Northridge, both of Calif., assignors to American Safety Equipment Corporation, Encino, Calif.

Filed Aug. 11, 1975, Ser. No. 603,520
Int. Cl.² B60R 21/10
U.S. Cl. 280—747 10 Claims



1. A single continuous loop safety belt harness assembly for a vehicle having a passenger admitting door adjacent a passenger seat within the vehicle with a floor mounted safety belt anchoring means secured to said vehicle inboard of said seat relative to said door comprising:

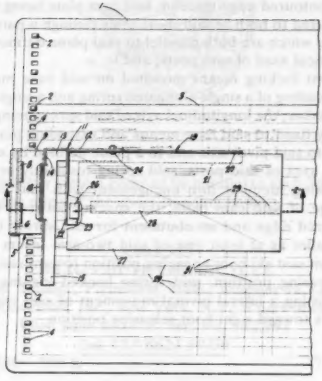
a single length of safety belt and means for securing its opposite ends to said door; and

connector means mounted to said safety belt intermediate its ends for releasable attachment to said anchoring means when said door is closed, whereby said safety belt, means for securing its opposite ends to said door and connector means are all mounted entirely upon said door for a swinging movement therewith when said connector means is not attached to said anchoring means.

3,993,329
CHECK LOCATOR

Charles C. Fiske, 3639 San Remo Drive, Santa Barbara, Calif. 93105

Filed July 14, 1975, Ser. No. 595,627
Int. Cl.² B41L 3/06
U.S. Cl. 282—29 B 6 Claims



1. A device—for locating a check in superposed, selectively positionally disposed relation to a lined, normally stationary bookkeeping sheet of a bookkeeping system which embodies a baseboard, and means for holding a bookkeeping sheet normally stationary on said baseboard—including a slide embracing and movable along one edge of the baseboard, a check-positioning member, means on said member for supporting checks with major portions of said checks overlying the bookkeeping sheet, and means mounting the check-positioning member in connection with the slide and projecting over the bookkeeping sheet so that by slide motion said check-positioning member can be disposed to position a check, of data-transfer type, with a predetermined line thereof in register with a selected line of the bookkeeping sheet; characterized by said mounting means including a plate, a hinge between said slide and said plate which permits of arcuate swinging of the check-positioning member upwardly from the bookkeeping sheet, said plate extending inwardly from the slide to normally overlie said baseboard, and a base tongue and slot connection inwardly of and separate from the hinge between said plate and said check positioning member which permits of independent, vertical floating motion of said check-positioning member substantially parallel to said baseboard.

3,993,330
CONDUITS FOR ELECTRICAL CONDUCTORS

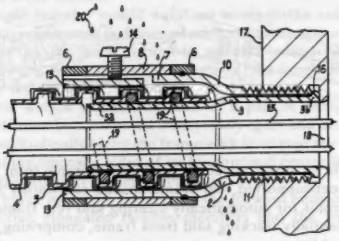
Bengt Sigvard Goransson, 6 Ridvagen, 73600 Kungsor, Sweden

Continuation-in-part of Ser. No. 537,775, Dec. 31, 1974, abandoned. This application Feb. 10, 1976, Ser. No. 656,985
Int. Cl.² F16L 33/18
U.S. Cl. 285—14 2 Claims

1. The combination of a spirally wound, profiled, metal tube conduit having a lining of plastics material and a coupling means for terminating said conduit at a bulkhead in which said coupling means comprises; a drainable connector body with means for clamping the body to the conduit, the body having a through bore and providing a bulkhead engaging end with an open bore a conduit clamping end with an open bore; and a tubular sleeve, coaxial within the body, to define with the body an annular recess; into which the end of the conduit fits to embrace the sleeve, the tubular sleeve having these features;

a. it defines a passageway through electrical conductors can be passed without possibility of contact between conductors and conduit end,

b. it has a part projecting beyond the bulkhead engaging end of the connector body so that conductors can emerge from said end without possibility of contact between said



conductors and the end and so that an end face seal for the connector body to a bulkhead is provided,

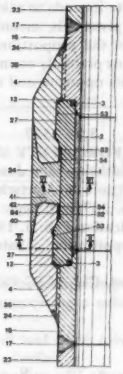
c. it has a conicity so that when the conduit end is inserted to embrace the sleeve the lining of the conduit is caused to grip the sleeve tightly, and

d. it has a spiral of sealing material sealing between the sleeve and the conduit lining.

3,993,331
ELECTRICALLY INSULATING PIPE COUPLING

Walter Schwarz, Engerthstrasse 237 B, Vienna 2, Austria

Filed July 10, 1974, Ser. No. 486,954
Claims priority, application Austria, July 13, 1973, 6215/73
Int. Cl.² F16L 11/12
U.S. Cl. 285—53 26 Claims



1. An electricaly insulating pipe coupling, which comprises:
two sockets of electrically conducting material spaced from one another in axial alignment,
a tubular coupling member consisting of plastic material in which reinforcements are embedded, said coupling member being tightly fitted at each of its ends by insertion into one of said sockets and provided at each of its ends with an annular bead disposed in the respective socket,
said coupling member being split longitudinally and thereby formed with at least one interface which extends throughout the length of the coupling member and is defined by two abutting surfaces which allows the coupling to be curled on itself thereby allowing each bead to be disposed as aforesaid, and

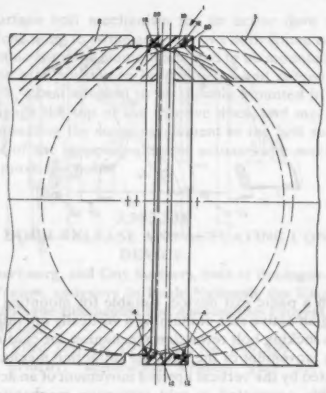
a layer of insulating material surrounding said coupling member between said sockets.

3,993,332

PIPE JOINT

Daniel J. Borodin, Detroit, and Wilbur E. Tolliver, Holland, both of Mich., assignors to New York Wire Mills Corporation, Tonawanda, N.Y.

Filed Jan. 20, 1975, Ser. No. 542,379
Int. Cl.² F16L 27/06
U.S. Cl. 285—94 **11 Claims**



1. A pipe joint for joining adjacent sections of sewer pipes, water pipe or the like, said joint comprising:

first and second pipe sections having cylindrical walls and end portions of lesser wall thickness than said cylindrical walls;

a first spherically tapered surface at one end of said first pipe section extending therearound and having an extremity beyond which it extends no farther;

a coupling collar for receiving said ends of said first and second pipe sections, said coupling collar having a wall thickness which is less than the wall thickness of said cylindrical walls of said pipe section and which, when combined with the wall thickness of said end portions of said pipe sections gives a combined thickness comparable to the thickness of said cylindrical walls, thereby eliminating protrusions from the inner and outer surfaces of said pipe sections; said coupling collar defining a second spherically tapered surface facing said first pipe section extending annularly therearound and having an extremity beyond which it extends no farther; said coupling collar defining a third spherically tapered surface generally adjacent said second spherically tapered surface and facing said second pipe section, said third spherically tapered surface extending annularly around said coupling collar and having an extremity beyond which it extends no farther; said second pipe section having a fourth spherically tapered surface at one end thereof extending annularly therearound and having an extremity beyond which it extends no farther, said third and fourth spherically tapered surfaces having mating configurations whereby said coupling collar can be joined to said second pipe section by matingly engaging said third and fourth spherically tapered surfaces;

said first and second spherically tapered surfaces having mating configurations whereby said first pipe section and said coupling collar can be joined together by matingly engaging said first and second spherically tapered surfaces;

one of said first and second spherically tapered surfaces facing outwardly with respect to the center line of said first pipe section and the other of said spherically tapered surfaces facing inwardly with respect to the center line of said first pipe section to facilitate said mating engagement with one another;

said outwardly facing spherically tapered surface facing convexly outwardly, when viewed in longitudinal cross section, and tapering continuously from a point nearer its pipe section center line at said extremity to a point farther from said pipe center line and spaced along its length a distance away from said extremity;

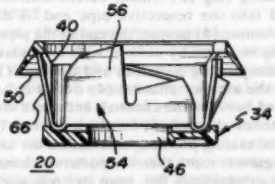
said inwardly facing spherically tapered surface having an inwardly facing concave configuration when viewed in longitudinal cross section and tapering continuously from a point farther from said pipe center line at its said extremity to a point nearer the pipe center line at a point spaced along its length a distance away from its said extremity whereby said first pipe section and said coupling collar form a ball and socket coupling when joined together without the need for any special clamps for creating the joint; one of said third and fourth spherically tapered surfaces facing outwardly with respect to the center line of said second pipe section and the other of said spherically tapered surfaces facing inwardly with respect to a center line of said second pipe section to facilitate said mating engagement with one another; said outwardly facing spherically tapered surface facing convexly outwardly, when viewed in longitudinal cross section, and tapering continuously from a point nearer said pipe section center line at said extremity to a point farther from said pipe center line and spaced along its length a distance away from said extremity; said inwardly facing spherically tapered surface having an inwardly facing concave configuration when viewed in longitudinal cross section and tapering continuously from a point farther from said pipe center line at its said extremity to a point nearer said pipe center line spaced along its length a distance away from its said extremity whereby said coupling collar and said second pipe section form a ball and socket coupling when joined together without the need for any special clamps for creating the joint and whereby the same degree of annular skew can be achieved between said first and second pipe sections as would be achieved by a single ball and socket joint directly between said pipe sections, but with a lesser degree of taper in the matingly engaging surfaces of said pipes and said collar than would be required for a direct connection between said first and second pipe sections.

3,993,333

CONNECTOR FOR FLEXIBLE METALLIC RACEWAY

Ranjit Biswas, Avenel, N.J., assignor to Thomas & Betts Corporation, Elizabeth, N.J.

Filed July 23, 1975, Ser. No. 598,430
Int. Cl.² F16L 11/12
U.S. Cl. 285—45 **4 Claims**



1. A connector for coupling a flexible metallic raceway to an electrical enclosure or similar structure comprising: cylindrical core means having a first end and a second end and

having a longitudinal passage therethrough; rib means coupled to said core means at said first end and extending inwardly into said longitudinal passage of said core means; said rib means defining at least a portion of a helix into which a portion of a flexible metallic raceway is placed, said rib means extending into the voids between adjacent convolutions of such flexible metallic raceway to couple mechanically and electrically said core means to said flexible metallic raceway; at least two tongue means coupled to said core means extending outwardly from said core means; shell means having a first and a second end and an aperture therethrough, said aperture in said shell means communicating with said longitudinal passage of said core means; lip means coupled to said first end of said shell means and extending outwardly therefrom to engage one surface of the wall of an electrical enclosure about a knock-out in said enclosure wall into which said connector is placed; at least two apertures in said shell means intermediate said first and said second ends of said shell means, one for each of said tongue means; each of said tongue means extending through its associated one of said apertures in said shell means, the free ends of each of said tongue means engaging the opposite surface of the wall of the electrical enclosure into which said connector is placed to prevent the unwanted withdrawal of the connector; and means to couple said core means to said shell means.

3,993,334

PIPE JOINTING PIECE WITH O-RINGS

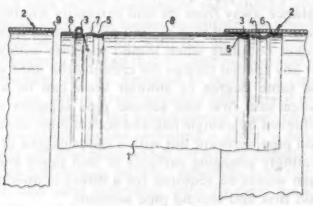
Rune Evert Fridman, Jonkoping, and Hans Gösta Johansson, Bankeryd, both of Sweden, assignors to Stifab AB, Jonkoping, Sweden

Filed Sept. 8, 1975, Ser. No. 611,332

Claims priority, application Sweden, Sept. 23, 1974, 7411933

Int. Cl.² F16L *17/00*

U.S. Cl. 285—344 **10 Claims**



1. A thin-walled pipe jointing piece (**1**), having substantially constant wall thickness, for sealingly connecting pipes (**2**), said jointing piece being provided at both ends with elastic sealing means (**3**) arranged in their operational position to engage sealingly with the inside of the respective connecting pipe ends, characterized in that in the area axially inwardly of each jointing piece end there are two outwardly open mutually separated channels (**4,5**) running circumferentially side by side and being formed in the jointing piece wall as well as an elastic sealing ring (**3**) which, before inserting the jointing piece end into the respective pipe end, is disposed in the anterior channel (**4**) nearest the end of the pipe jointing piece and during insertion by contact with and relative movement between the jointing piece (**1**) and the pipe (**2**) is caused to roll from the anterior channel (**4**) over a cylindrical portion (**7**) situated between the channels and down into the inwardly lying posterior channel (**5**) in which the ring (**3**) assumes its operational sealing position, and in that the anterior channel (**4**) has a greater width than the posterior channel (**5**) and has a bottom substantially flat, seen in cross section, while the bottom of the posterior channel (**5**) has an arcuate shape as seen in cross section, and that the portions (**6**) of the jointing piece lying outside the channels (**4,5**) at the respective jointing piece ends have substantially the same outside diameter as that of the main part of the jointing piece portion (**8**) situated between the sealing means at the two ends, while the annular portion (**7**) separating the channels (**4,5**) has a lesser diameter than said portions (**6,8**).

3,993,335

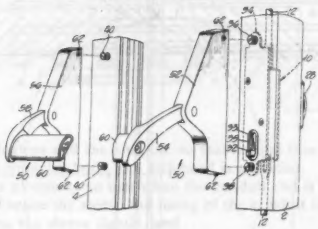
PANIC EXIT DEVICE

Joseph J. Schmidt, Los Angeles, Calif., assignor to Builders Brass Works Corporation, Los Angeles, Calif.

Filed Apr. 12, 1974, Ser. No. 460,390

Int. Cl.² E05C *9/14*

U.S. Cl. 292—21 **13 Claims**



1. In a panic exit device, suitable for mounting on a door having an active stile containing a vertically operating locking bolt; a locking bolt retraction mechanism for causing reciprocating movement of the bolt, the retraction mechanism being activated by the vertical upward movement of an actuating pin operably connected to said retraction mechanism; and an actuator device mounted on the stile for urging the actuating pin vertically upward; the improvement wherein the actuator device comprises:

an active unit housing mounted on the active stile;

an arm pivotally mounted in the active unit housing having a first end thereof extending from said housing and a second end thereof contained within said housing; and

an actuator link in said housing removably mounted on said second end of the arm by one end thereof and engaging the actuating pin at the other end thereof so that pivotal movement of the arm toward an active position causes a vertical upward movement of the actuator link which in turn causes a like vertical upward movement of the actuating pin wherein the actuator device is rendered inactive by removal of the actuator link therefrom.

3,993,336

GUARD TO PREVENT OPENING OF SLIDING DOORS

Genevieve O. Frost, 4807 5th Ave., Kenosha, Wis. 53140

Filed Aug. 25, 1975, Ser. No. 607,342

Int. Cl.² E05C *17/34*

U.S. Cl. 292—263 **3 Claims**

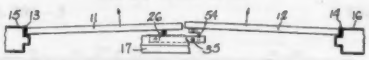
1. A guard to prevent the opening of a sliding door, and to optionally permit partial opening of said door, said guard comprising a longitudinal major portion, and a longitudinal minor portion, said portions positioned in an end-to-end abutting relationship, said portions terminating in cap members at the abutting ends thereof, a hinge integrally connecting the mutually-opposed cap members to permit pivoting of said minor portion 180° relative to said major portion, and parallel to said major portion.

3,993,337

AUTOMATIC SURFACE BOLT

William B. Imhoff, Springdale, Conn., assignor to Leigh Products, Inc., Coopersville, Mich.

Filed Sept. 15, 1975, Ser. No. 613,177
Int. Cl.² E05C 1/14
U.S. Cl. 292—332 16 Claims



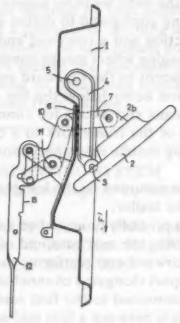
1. A surface bolt mechanism for an active door and an inactive door hung to swing as a pair in a door frame comprising a movable stopping element adapted to be mounted on the door frame in a position to be contacted and moved by the active door, a bolt adapted to be slidably mounted in a position to engage the top of the inactive door, and mechanical means connecting the stopping element to the bolt such that movement of the stopping element actuates the mechanical means to move the bolt.

3,993,338

SLIDING DOOR RELEASE AND ACTUATING CONTROL DEVICE

Robert Cherbourg, and Guy Soetaert, both of Boulogne-Billancourt, France, assignors to Regie Nationale des Usines Renault, Boulogne-Billancourt and Automobiles Peugeot, Paris, both of France

Filed July 28, 1975, Ser. No. 599,339
Claims priority, application France, July 31, 1974, 74.26567
Int. Cl.² E05C 21/00
U.S. Cl. 292—336.3 1 Claim



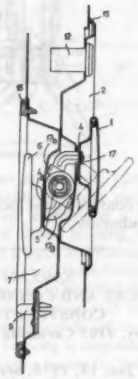
1. In a control device for a sliding door: casing means for connection to said door, yoke means pivotally connected adjacent one end thereof to said casing means, handle means pivotally connected to said yoke means adjacent the other end thereof, a lock control mechanism, and linkage means interconnecting said handle means and said lock control mechanism, said linkage means comprising a link pivotally connected to said handle means and bell-crank lever means pivotally connected to said link, said lock control mechanism including a lever provided with a substantially L-shaped slot, said bell-crank lever means having a stud movably received in said slot, and a pin adapted to engage said lever, whereby, upon pivoting said handle means about its pivotal connection with said yoke means and upon pivoting of said handle means and yoke means about the pivotal connection of the latter with said casing means, respectively, said pin on said bell-crank lever means displaces said link to thereby permit said stud to move from one leg of said L-shaped slot to the other and permit movement of said door in one direction and the other direction respectively.

3,993,339

PLATE-TYPE DOOR OPENING CONTROL DEVICE

Robert Cherbourg, and Guy Soetaert, both of Boulogne-Billancourt, France, assignors to Regie Nationale des Usines Renault, Boulogne-Billancourt and Automobiles Peugeot, Paris, both of France

Filed July 22, 1975, Ser. No. 598,033
Claims priority, application France, July 26, 1974, 74.26065
Int. Cl.² E05C 21/00
U.S. Cl. 292—336.3 5 Claims



1. A device for controlling opening of a door from both outside and inside, said device comprising: a shaft, a first plate mounted on and for rotation with said shaft and located on one side of said door, a second plate mounted on said shaft for loose rotation on said shaft and being located on the other side of said door, and means for interconnecting said plates for rotation thereof in one direction about said shaft.

3,993,340

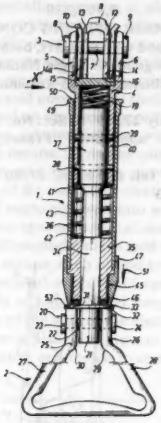
CHOPPING SPADES

Willi Rusing, and Rudolf Adamovsky, both of Herdecke, Germany, assignors to Idealspaten-und Schaufelwalzwerke A. Bredt & Co. KG, Herdecke, Germany

Filed Jan. 9, 1976, Ser. No. 647,716
Claims priority, application Germany, June 18, 1975, 2527146
Int. Cl.² A01A 1/22
U.S. Cl. 294—53.5 12 Claims

1. A collapsible chopping spade comprising a tool, a handle, a shaft, a tool joint at one end of said shaft, a handle joint at the other end of said shaft, the tool joint comprising a tool joint bearing, a joint bolt supported by said tool joint bearing and a joint part supported by said bolt and fixed to said tool, said joint part having a respective support edge associated with each of the various positions of said tool, a movable tool abutment adapted to engage with said support edges for locking and unlocking the tool joint, the handle joint comprising a part integral with said handle, a handle joint bearing rigidly connected to the tool joint bearing, a joint bolt supported by said handle joint bearing a movable handle abutment for engagement with support edges formed on said handle and

associated with each of the various positions of the handle, and a stay extending between the handle abutment and the



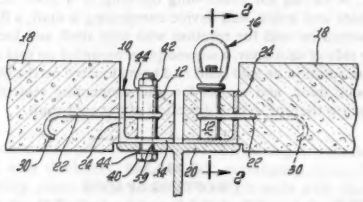
tool abutment for controlling the locking and unlocking movements of both abutments.

3,993,341

DECK STRUCTURE AND CONNECTOR FOR BUILDING CONSTRUCTION

Charles A. Bentley, 9105 Carmelita Ave., Beverly Hills, Calif. 90210

Filed Jan. 14, 1975, Ser. No. 540,827
Int. Cl.² B66C *1/54*; E04B *1/41*; E04C *5/12*
U.S. Cl. 294—89 **12 Claims**



1. In a deck structure comprising concrete slabs each having connectors spaced apart along the edges of said slab for attachment to an underlying beam, the improvement wherein certain ones of said connectors include:

a horizontal plate adjacent the bottom of said slab;

a vertical bushing attached at a junction with and extending upwardly from said horizontal plate and embedded in said slab and including a downwardly facing contact surface on the inside wall of said bushing adjacent said junction with said horizontal plate for direct coupling to the bottom of said slab;

a lifting bolt removably insertable in said bushing, said lifting bolt including laterally expandable means movable from a retracted unlocked position to an expanded locked position engaging said downwardly facing contact surface for lifting said slab into its mounting location on top of said beam, and

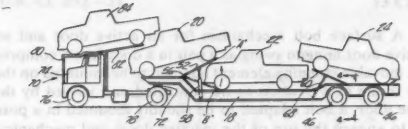
actuating means connected to said lifting bolt for locking and unlocking said expandable means.

3,993,342

CONVERTIBLE VEHICLE CARRIER

Paul Jones, 4347 Moon Light Drive, and Ferris Jones, 4307 Moon Light Drive, both of Holly, Mich. 48442

Filed Nov. 4, 1974, Ser. No. 520,564
Int. Cl.² B60P *3/06*
U.S. Cl. 296—1 A **3 Claims**



1. A flat bed semi-trailer adapted to be towed by a tractor for hauling either mobile machinery such as a bulldozer and the like, or for hauling automotive passenger vehicles such as pick-up trucks and the like, comprising:

a framework having a plurality of substantially parallel, elongated longitudinal beams disposed such that a portion of each beam is disposed in a horizontal plane with similar portions of the other beams, and the distance between certain of the longitudinal beams is less than the width of the vehicles to be supported thereon, the framework being configured to define a forward end platform, a mid-section and a rearward end platform;

ground-engaging wheel means connected below said framework adjacent to the rearward end platform thereof, the mid-section being below the top of the ground-engaging wheel means and means for connecting the forward end platform of the framework to a conventional tractor for supporting mobile machinery mounted on the longituinal beams;

metal plates mounted on the longitudinal beams to form the bed of the trailer;

a first ramp pivotally mounted on said forward end platform for receiving the rearward end of a first vehicle mounted on the forward end platform, the ramp having a pair of spaced apart elongated channel-shaped tracks, and power means connected to the first ramp for raising it with the first vehicle between a first mid-section engaging position and a second position in which the rearward end of the first vehicle is disposed above the mid-section to allow the forward end of a second vehicle to be supported on the mid-section below the rearward end of the first vehicle;

a second ramp detachably mounted to the metal plate on said rearward end platform, the ramp including a pair of spaced apart channel-shaped tracks adapted to receive the tires of a motor vehicle therewithin, for supporting one end of a third vehicle above the rearward end of the second vehicle such that the rearward end of the third vehicle is mounted on said rearward end platform;

means for readily detachably mounting the second ramp to the rearward end platform whereby the ramp can be readily removed to permit the loading of heavy machinery having a track width greater than that of the tracks of the second ramp onto the mid-section of the trailer, and

a pair of legs extending between the second ramp and the mid-section for supporting the second ramp in an inclined position when receiving one end of the third vehicle.

3,993,343

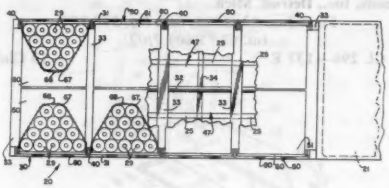
TRANSPORTING SYSTEM

Richard C. Bennett, 7333 Armitage Ave., Elmwood Park, Ill. 60635

Division of Ser. No. 561,929, March 25, 1975, Pat. No. 3,934,926, which is a continuation of Ser. No. 375,689, July 2, 1973, abandoned. This application Sept. 12, 1975, Ser. No. 612,716

Int. Cl.² B62D 23/00

U.S. Cl. 296—3 3 Claims



1. A transporting system comprising a load-supporting bed forming part of a vehicle, said bed having a pair of longitudinally extending sides and a pair of laterally extending ends, said bed including longitudinally extending beams and laterally extending beams so as to be of substantially open construction, a plurality of longitudinally spaced-apart dividers on said bed adjacent to said sides and arranged to divide said bed into a plurality of bays, a corresponding plurality of pallets arranged to be carried by a loader-unloader respectively into and out of said bays, each of said pallets including an article-supporting plate which has a substantially flat outer surface, the outer surfaces respectively of said pallets being substantially coplanar so as to define substantially the entire floor upon which one may walk and upon which articles may be disposed, there being no dividers on said bed on the interior thereof so that the floor defined by said pallets is not interrupted by dividers, and a plurality of latching mechanisms on said dividers and respectively on said pallets and each having a latching condition to secure the associated pallet in the associated bay and having an unlatching condition to enable such pallet to be removed from its bay.

3,993,344

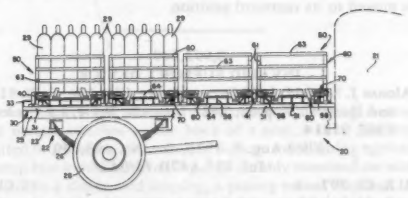
TRANSPORTING SYSTEM

Richard C. Bennett, 7333 Armitage Ave., Elmwood Park, Ill. 60635

Division of Ser. No. 375,689, July 2, 1973, abandoned. This application Mar. 4, 1975, Ser. No. 555,160

Int. Cl.² B62D 23/00

U.S. Cl. 296—35 A 8 Claims



1. A transporting system comprising a load-supporting bed forming part of a vehicle, said bed being of open construction and including a longitudinally extending cylindrical center beam and two longitudinally extending side beams and a plurality of laterally extending crossbeams, a plurality of pallets arranged to be carried by a loader-unloader respectively onto and off of said bed, each of said pallets including an inner end supported in use by said center beam and an outer end supported in use by one of said side beams, each of said pallets including an article-supporting plate, a pallet being loaded onto said bed by approaching said beam at an acute angle with respect to said bed and resting the associated plate on said center beam and then rotating said pallet until said outer end rests on said one side beam.

3,993,345

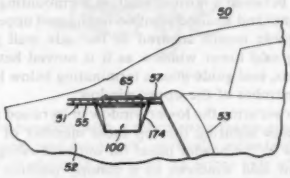
ENCLOSURE FOR AUTOMOBILE TRUNK-MOUNTED LOUDSPEAKER

Robert E. Croup, Indianapolis, Ind., assignor to Acoustic Fiber Sound Systems, Inc., Indianapolis, Ind.

Filed Oct. 29, 1975, Ser. No. 626,729

Int. Cl.² B60R 5/00

U.S. Cl. 296—37.16 20 Claims



1. An enclosure for an automobile trunk-mounted open loudspeaker carried beneath the rear package shelf of an automobile, said enclosure comprising a plurality of walls interconnected to form a closed housing, one of said walls having an opening therein shaped and dimensioned for receiving the associated loudspeaker therethrough and into said housing to permit said housing to be fitted over the associated loudspeaker to a mounting position, said one wall being disposed snugly against the underside of the associated rear package shelf when said housing is disposed in the mounting position thereof, and mounting means for holding said housing in the mounting position thereof.

3,993,346

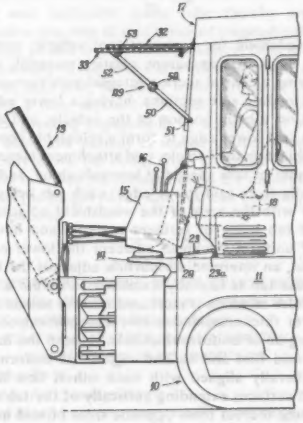
REAR WALL STRUCTURE FOR A VEHICLE CAB

William T. Mounts, Chillicothe, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed May 27, 1975, Ser. No. 581,296

Int. Cl.² B60J 1/20

U.S. Cl. 296—84 N 18 Claims



1. In a cab for a vehicle, a rear wall structure comprising, in combination:

an upstanding transverse lower wall panel, a transverse header panel, and upright side wall panels defining a window opening;

an upper window normally occupying the top half of said window opening, said upper window including an upper frame having top and bottom cross members and upright side members, a transparent panel fixedly mounted in said upper frame, and guide rails integral with said side members;

a lower window normally occupying the bottom half of said window opening, said lower window including a lower frame having top and bottom cross bars and upright side bars, a transparent panel fixedly mounted in said lower frame, and guide channels integral with said side bars which slide on said guide rails as said lower window is moved between a normal position surmounting the lower wall panel and a raised position facing said upper window;

upright guide means secured to the side wall panels for guiding said lower window as it is moved between said positions, said guide means terminating below the bottom cross member of the upper window;

means for securing the lower window in its raised position;

hinge means securing the top cross member of the upper window to the header panel for outward swinging movement of said windows to a canopy position when the lower window is in its raised position;

and means for securing said windows in said canopy position.

3,993,347

WINDSHIELD MOUNTING

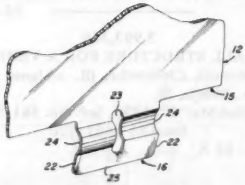
Jerome Bombardier, Valcourt, Canada, assignor to Bombardier Limited, Valcourt, Canada

Filed Mar. 21, 1975, Ser. No. 560,796

Claims priority, application Canada, Oct. 8, 1974, 210954

Int. Cl.² B60J *1/02*

U.S. Cl. 296—90 **8 Claims**



1. A windshield for a recreational vehicle, comprising a moulded sheet of transparent plastics material, said windshield having a central section integral with two curved rearwardly extending side sections, having a lower edge for engagement on a body portion of the vehicle, and attachment means on said lower edge to form a releasable connection of the windshield on the vehicle, said attachment means comprising a number of tabs spaced at intervals along, and extending downwardly from said lower edge, each tab being generally co-planar with the area of the windshield adjacent thereto, each said tab being of resilient material and having a first region of uniform thickness adjacent the lower edge of the windshield, an intermediate portion adjacent the first region wherein the tab is laterally extended to define a region the overall width of which is increased relative to said first region of uniform thickness, and a free end portion comprising a second region of uniform thickness beneath the intermediate portion, said first and second regions of uniform thickness being generally aligned with each other, first and second transition surfaces extending vertically of the tab at an angle to the plane thereof from opposite sides of said intermediate portion to each of said first and second regions respectively, the intermediate portion being itself resiliently compressible to a smaller overall width when urged through a slot narrower than said original overall width through interaction of the edges of the slot with said first or second transition surfaces respectively, and then returning to its extended condition when disengaged from the slot edges, to thereby form a releasable connection between the windshield and the mounting slot.

3,993,348

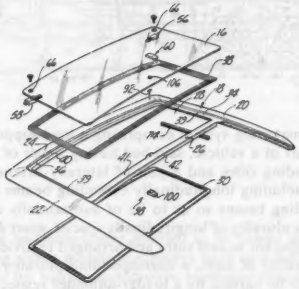
SLIDING ROOF ASSEMBLY

William J. Pizzuti, Bloomfield Hills, Mich., assignor to Skytrends, Inc., Detroit, Mich.

Filed Jan. 13, 1975, Ser. No. 540,727

Int. Cl.² B60J *7/02*

U.S. Cl. 296—137 E **13 Claims**



1. A sliding roof assembly for attachment to the top surface of a roof of a vehicle in proximity to an opening in the vehicle roof, the combination of: a frame member having a pair of longitudinally extending side members, a forward member extending transversely between said side members, an intermediate member being disposed adjacent the rearward edge of said opening in the vehicle roof, said side members including guide portions forming slots facing each other, a panel member mounted with opposite edges in said slots for sliding movement between a forward position closing said opening and an open position rearwardly of said opening and above the roof, a continuous, endless seal means mounted on said side members and said forward and intermediate members at the underside of said panel member and in proximity to the perimeter of said opening, latch means associated with forward and rearward portions of said panel member and operable to pull the underside of said panel member into sealing engagement with said seal member when said panel is in its forward position and a cam means adjacent a rearward portion of said frame for separating said panel from said seal when said panel is moved to its rearward position.

3,993,349

INVALID SUPPORT DEVICE

Alonzo J. Neufeld, 1650 Parway Drive, Glendale, Calif. 91206, and Hazel L. Hopson, 2423 Laughlin Drive, La Crescenta, Calif. 91214

Filed Aug. 8, 1975, Ser. No. 603,030

Int. Cl.² A47D *13/04*

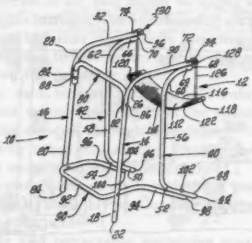
U.S. Cl. 297—6 **11 Claims**

1. An invalid support device capable of serving as a walker to support a person when in a vertical walking position and to be utilized as a seat and alternatively to serve as a back support including:

a generally U-shaped frame member having ends for resting on a floor surface and rising to a height above said floor surface, said frame member having generally parallel spaced apart arm handle portions forming the upper limits of said frame member and terminating in rearwardly facing ends, and said frame member including a

cross support member forwardly of and remote from said rearwardly facing ends;

foot rest means underlying said cross support member and elevated above said frame member ends and said floor surface;



a pair of body support retention means associated with said U-shaped frame member and being spaced apart at least the distance between said arm handle portions; and

shiftable body support means mounted in said pair of body support retention means and extending therebetween, said body support means positionable as a seat and in the alternative as a backrest.

3,993,350

SEAT ARM ADJUSTMENT MECHANISMS

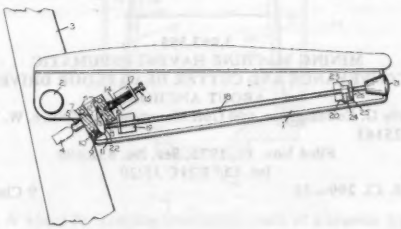
Arthur Herbert McFarlane, Basildon, England, assignor to Teleflex Morse Ltd., Basildon, England

Filed Jan. 20, 1975, Ser. No. 542,479

Claims priority, application United Kingdom, Feb. 1, 1974, 4858/74

Int. Cl.² A47C 7/54

U.S. Cl. 297—417 **2 Claims**



1. A seat arm adjustment mechanism comprising a stop block means attached to the back of a seat, a shaft slidably mounted in a housing mounted on the arm and bearing against said stop block means, a locking arm slidably mounted on said shaft within a slot in said housing, a biasing means disposed in said housing and positionally held by screw means, said spring effecting a biasing force against a face of said locking arm, a raised portion of said locking arm bearing against a face of said housing, spring biasing means mounted on a screw between an end portion of said shaft and a bracket means adapted to move said shaft toward said stop block means, an elongated rod slidably mounted on bracket means mounted on said arm, said rod having a knob attached thereto to bear against a face on said locking arm opposite said spring biasing member.

3,993,351

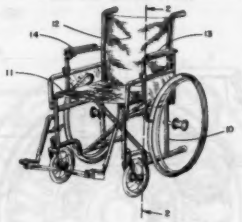
VERTICALLY ADJUSTABLE WHEELCHAIR ARM REST

Keith Samuel Rodaway, Santa Monica, Calif., assignor to Everest & Jennings, Inc., Los Angeles, Calif.

Filed Nov. 3, 1975, Ser. No. 628,195

Int. Cl.² A47C 1/12

U.S. Cl. 297—422 **2 Claims**



1. In combination with a wheelchair frame structure supporting a seat and back rest, vertically adjustable arm rest assemblies in elevated positions on either side of said seat, each of said arm rest assemblies including:

a. front and rear vertical parallel tubes supported by said frame structure;

b. a padded arm rest;

c. front and rear downwardly extending parallel arm rest support tubes secured to the underside of said padded arm rest and respectively telescopically received in said vertical tubes, said frame structure including at each side an horizontal frame tube intersecting the upper portion of the front vertical tube at a spaced distance below its upper end;

d. an oval shaped collar surrounding the upper end of said front vertical tube and resting on said horizontal frame tube, the inner rear wall of said collar having a forwardly directed projection and the upper rear wall of said vertical tube having an opening receiving said projection, the front arm rest support tube telescopically received within the front vertical tube having a series of longitudinally spaced openings in its rear wall any one of which may be brought into registration with said opening receiving said projection; and,

e. a spring means between the inner front wall of said collar and the exterior front portion of the upper end of said first vertical tube to bias said oval shaped collar forwardly along said horizontal frame tube thereby urging said projection into one of said series of longitudinally spaced openings in said front arm rest support tube so that said arm rest may be supported at a selected height above the plane of said seat, the outer front surface of said collar defining a fully exposed forwardly facing engaging surface for pressing engagement by a portion of a patient's body when the patient is seated in the wheelchair to physically move the collar from its biased position to a position in which the forward tubes are unlocked so that the selected height of the arm rest can be easily changed by the patient.

3,993,352

ENERGY ABSORBING DUMP TRUCK BODY

Akira Yamanaka, Yokohama, Japan, assignor to Mitsubishi Jidosha Kogyo Kabushiki Kaisha, Japan

Filed Sept. 17, 1974, Ser. No. 506,796

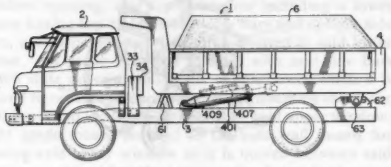
Int. Cl.² B60R 21/02; B60P 1/28

U.S. Cl. 298—20 R **11 Claims**

1. A dump truck, comprising:

a frame; a dump body; means pivotally mounting said dump body on said frame for movement between a normal horizontal position and an inclined, dumping position, said mounting means including means allowing said dump

body to slide longitudinally of said frame in response to a predetermined impact force, while absorbing kinetic energy; a hoisting unit for moving said body between said horizontal and inclined positions, said unit comprising a cylinder pivotally connected to one of said frame and said body, a piston slidably mounted within said cylinder, a rod connected to said piston, extending from said cylinder and pivotally connected to the other of said frame and



said body, said piston dividing said cylinder into first and second fluid chambers, means defining a passage interconnecting said first and second chambers, and means for selectively closing said passage, whereby when said passage is opened and said dump body slides longitudinally of said frame, fluid passes between said first and second chambers, the fluid resistance of said passage absorbing kinetic energy.

3,993,353

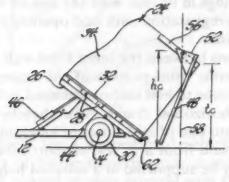
FARM WAGON VEHICLE

James H. Reilly, 7345 Wilcox, Brown City, Mich. 48416

Continuation of Ser. No. 439,338, Feb. 4, 1974, abandoned. This application May 30, 1975, Ser. No. 582,897

Int. Cl.² B60P *1/04*

U.S. Cl. 298—22 R **6 Claims**



4. A latching mechanism for releasing and retaining two hingedly connected members together, where one of said members is itself tiltable about a given axis, and which is automatically responsive to the tilted disposition thereof, comprising; a latch member hingedly connected to the tiltable one of said members for engagement with and the release of the free end of the other of said members, a laterally flexible cable fastened between the free end of said latch member and a relatively fixed anchoring point a foreshortened distance apart from said given axis for causing said cable to be shortened and slackened and to release said latch member upon the tilting of said one member and said cable to be drawn tight for activating said latch member in the untilted disposition thereof, and having the hinging axis for said two hingedly connected members disposed sufficiently apart and forwardly of said latch member for precluding premature actuation inhibiting pressure thereagainst.

3,993,354

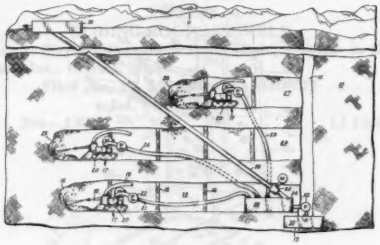
MULTI-LEVEL HYDRAULIC MINING SYSTEM

Oliver B. Kilroy, 5 Calle Corta St., Tucson, Ariz. 85716

Filed May 16, 1975, Ser. No. 578,312

Int. Cl.² E21C *35/20*

U.S. Cl. 299—19 **8 Claims**



1. For installation in a mine including a plurality of horizontal stopes at different levels which extend from a surface having a vertical component, with each stope presenting a mining face, apparatus comprising:

a. a mining device in each stope for mining ore from the face of that stope,

b. mechanism in each stope for converting ore mined from the face of that stope into a slurry,

c. a main slurry mix tank at the lowermost of said stopes,

d. a flexible conduit extending from the converting mechanism in said lowermost stope to said main slurry mix tank and including a pump,

e. a flexible conduit connected to the converting mechanism in each stope above said lowermost stope and including a pump adjacent to said converting mechanism and a portion that slants downwardly from said pump to said main slurry mix tank,

f. a water supply for said slurry mix tank in the form of an underground reservoir,

g. an outflow tube having its lower end communicating with said slurry mix tank; and

h. a pump in said outflow tube for moving slurry therein.

3,993,355

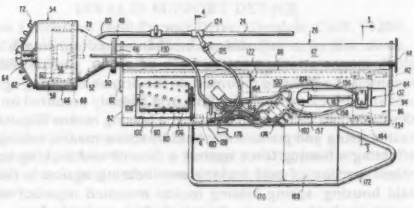
MINING MACHINE HAVING PNEUMATIC CONVEYANCE AND CUTTER HEAD FLOOR DRIVEN ABOUT ANCHOR

Kelly G. Cunningham, 600 Goff Mountain Road, Nitro, W. Va. 25143

Filed Nov. 17, 1975, Ser. No. 632,600

Int. Cl.² E21C *35/20*

U.S. Cl. 299—31 **9 Claims**



1. In a mining system, mining apparatus comprising:

a leading apparatus section including an initial conduit having an intake end;

an extensible tubular conduit secured to the initial conduit;

means to supply a stream of air under pressure into the initial conduit;

a cutter head assembly on said intake end, said cutter head assembly including: a drum open at one end, means for fluid communicating said drum to said intake end, mounting means for mounting an air motor, an air motor in said mounting means and coupled to said means for supplying said stream of air, said motor including air motor exhaust means for introduction of exhausted air into said conduit, a rotatable cutter operatively mounted to said assembly and coupled to said motor and having a series of leading teeth on the rotatable cutter;

whereby, said air exhaust into said enlarged intake end exhausts mined material from the cutter head assembly into said conduit through said drum;

the leading apparatus section further including platform means secured to the initial conduit;

ground contact means on the platform means to pivot the cutter head assembly and leading apparatus section from side-to-side; and

extensible and retractable anchoring means on said platform means mounted for movement relative to the platform means and extendable to an anchoring position and retractable to a transit position.

3,993,356

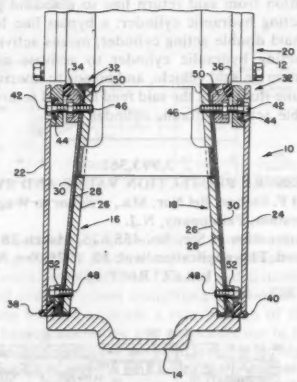
TRACK CARRYING WHEELS FOR CRAWLER TYPE VEHICLES HAVING IMPROVED PANEL ASSEMBLIES

Eugene R. Groff, Chillicothe, and Paul L. Wright, Peoria, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Filed Oct. 14, 1975, Ser. No. 622,205

Int. Cl.² B60B *19/00*

U.S. Cl. 301—6 WB **8 Claims**



1. A wheel for carrying continuous track of a crawler type vehicle, comprising:

a hub member;

a rim;

first and second spaced inner panels connecting the hub to the rim;

first and second outer panels each spaced from a respective inner panel, one of said pair of inner panels and said pair of outer panels being a laminate formed of at least first and second different materials;

means for connecting the outer panels to the inner panels at locations immediately adjacent only the hub;

a pair of first vibration damping elements, each element being positioned between respective inner and outer panels adjacent the hub; and

a pair of second vibration damping elements, each element being positioned between respective inner and outer panels adjacent the rim.

3,993,357

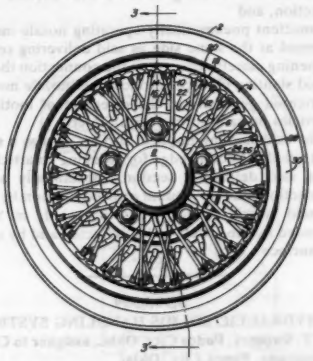
WIRE WHEEL

Merlyn R. Reppert, Torrance, Calif., assignor to W. R. Grace & Co., Columbia, Md.

Continuation-in-part of Ser. No. 519,096, Oct. 30, 1974, abandoned, and Ser. No. 521,705, Nov. 7, 1974. This application Mar. 20, 1975, Ser. No. 560,409

Int. Cl.² B60B *1/02*

U.S. Cl. 301—58 **16 Claims**



1. A wire spoke wheel center structure separate from and adapted to be mounted in an automotive tubeless tire rim, the combination comprising an outer band, a hub concentrically located within said band, wire spokes interconnecting said band and said hub; said outer band comprising a radially outermost portion adapted to be affixed to the drop center of an automobile tubeless tire rim, a generally radially disposed front portion extending radially inwardly with respect to from said outermost portion, a generally axially disposed portion extending rearwardly from said front portion of said band, and said axially disposed portion being formed with openings; a wire spoke nipple disposed in each of said openings and cooperating with the outer ends of said spokes, and all of said wire spoke nipples being accessible from the rear side of said wire spoke wheel center on the radial inside of said band axially disposed portion when said center is mounted in an automotive tubeless tire rim.

3,993,358

SWITCHING DEVICE FOR A CONVEYOR OF LETTERS, CARDS OR OTHER THIN ARTICLES

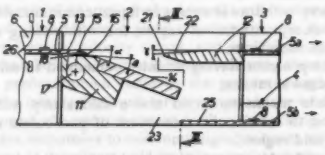
Jean-Pierre Volat, Aix-en-Provence, and Jean-Louis Elie Pichon, Marseille, both of France, assignors to Bertin & Cie, Plaisir, France

Filed June 11, 1975, Ser. No. 585,884

Claims priority, application France, June 11, 1974, 74.20108

Int. Cl.² B65G *51/02*

U.S. Cl. 302—2 R **6 Claims**



1. Device for switching thin articles which move flat in succession after each other over a conveyor track leading to

a delivering end section which is separated by a gap from (i) a first collecting section extending generally level with said delivering section and adapted to receive undeflected articles flying by their momentum clear over said gap on their normal path, and (ii) a second collecting section extending distinctly apart from said first collecting section and adapted to receive articles deflected away from said normal path across said gap,

wherein the improvement comprises:

a physical surface connected to the end of said delivering section and slanting towards said second collecting section, and

intermittent pneumatically-operating nozzle means positioned at the same side as said delivering section and opening closely adjacent to the connection thereof with said slanting physical surface, said nozzle means being oriented generally in the direction of motion of the articles on said normal path thereof,

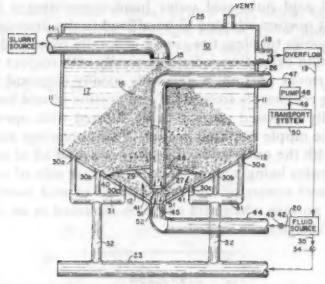
whereby said slanting physical surface acts as a selectively controlled deflecting edge for swinging an article arriving from said delivering section, substantially about said connection, due to vacuum exerted thereon by jet action of said nozzle means when operated, in the space bounded by the article to be deflected and by said physical surface.

3,993,359

HYDRAULIC SOLIDS HANDLING SYSTEM

William T. Sweeney, Ponca City, Okla., assignor to Continental Oil Company, Ponca City, Okla.

Filed Apr. 21, 1975, Ser. No. 570,056
Int. Cl.² B65G *53/30*
U.S. Cl. 302—15 **3 Claims**



1. An apparatus for receiving solids, liquid, slurries, and mixtures thereof and discharging a slurry stream having a controlled particulate matter content, said apparatus comprising:

a. a tank means having sidewalls and a bottom;

b. an inlet means for continuously passing solids, liquids, slurries, and mixtures thereof to form a liquid slurry, into said tank means;

c. a slurry withdrawal region adjacent the bottom of said tank means;

d. a slurry withdrawal means in liquid communication with said slurry withdrawal region for withdrawing a slurry stream therefrom;

e. a pump means having its inlet connected to said slurry withdrawal means;

f. a plate means mounted above said slurry withdrawal region to restrict the movement of particulate material into said region;

g. a liquid inlet means positioned below said slurry withdrawal means and in fluid communication with said tank means for injecting liquids into said slurry withdrawal region; and

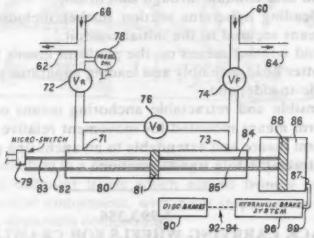
h. a plurality of jet means positioned along the bottom of said tank means on each side of said plate means and in fluid communication with the inside of said tank to inject fluid in a manner to prevent the accumulation of solids thereon.

3,993,360

APPARATUS FOR SAFETY BRAKING OF VEHICLES

Clarence Kirk Greene, 100 N. Arlington Ave., Reno, Nev. 89501

Filed Mar. 26, 1975, Ser. No. 562,042
Int. Cl.² B60T *13/68*
U.S. Cl. 303—3 **5 Claims**



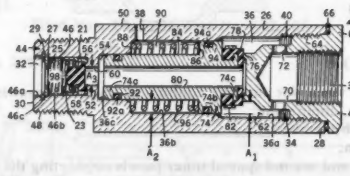
1. The combination with at least one wheel of the vehicle traveling upon wheels of: hydraulic motor means attached to said wheel; hydraulic pump means hydraulically connected to said motor, by a feed line and a return line; a connection from said feed line to one port of a double acting hydraulic cylinder; a connection from said return line to a second port of said double acting hydraulic cylinder; a bypass line between the ports of said double acting cylinder; means activated by said double acting hydraulic cylinder to activate an hydraulic brake system on said vehicle; and means to interrupt the flow of hydraulic fluid from the said feed line and return line to the said double acting hydraulic cylinder.

3,993,361

PRESSURE PROTECTION VALVE AND SYSTEM

Raymond F. Stelzer, Bel Nor, Mo., assignor to Wagner Electric Corporation, Parsippany, N.J.

Continuation of Ser. No. 455,625, March 28, 1974, abandoned. This application Sept. 10, 1975, Ser. No. 612,203
Int. Cl.² B60T *15/00*
U.S. Cl. 303—64 **1 Claim**



1. A fluid pressure vehicle braking system comprising:

a fluid pressure producing source,

a fluid pressure main reservoir tank connected to receive fluid under pressure from the source;

a plurality of vehicle braking means connected to receive fluid under pressure from the fluid pressure main reservoir tank;

a housing having a first end connected to receive fluid from the source and a second end connected to deliver fluid to an auxiliary reservoir tank;

the housing having a passageway therethrough for permitting fluid to flow from the first to the second end and

further including a first portion of the passageway adjacent the first end and a second portion of the passageway adjacent the second end;

first pressure responsive means in the first portion biased by a predetermined force F_1 and permitting the flow of fluid from the first to the second end only when a force applied thereagainst exceeds F_1, said force F_1 resulting at least in part from atmospheric pressure and said first pressure responsive means including communication means for communicating said first pressure responsive means with the atmosphere;

second pressure responsive means in the second portion said second pressure responsive means comprising a valve seat and a sealing valve member one of which is composed of a resilient material biased thereagainst by a spring member which applies a predetermined force F_2;

said force F_2 being nominal with respect to said force F_1;

said second pressure responsive means permitting the flow of fluid from the first to the second end only when a fluid force is applied thereagainst which exceeds F_2; and

said second pressure responsive means preventing the flow of fluid from the second end to the first end of said housing.

3,993,362

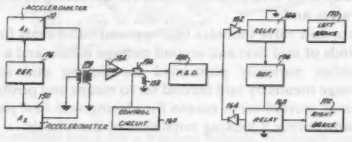
ANTI-JACKKNIFING AND SKIDDING CONTROL SYSTEM

Jerome H. Kamins, 1036 Mayfair Road, Baldwin, N.Y. 11510; Michael I. Mandell, 15 Westland Drive; Harry Armen, Jr., 27 Jefferson St., both of Glen Cove, N.Y. 11542, and Paul Savet, 505 Alica Drive, Westbury, N.Y. 11590

Continuation-in-part of Ser. No. 380,658, July 19, 1973, abandoned. This application Apr. 1, 1975, Ser. No. 563,958

Int. Cl.² B60T *8/02*

U.S. Cl. 303—21 BE **14 Claims**



1. An anti-jackknifing and skidding control system for a vehicle having a towed section and a towing section and including left wheel and right wheel brakes and actuating means therefor, said control system comprising at least one accelerometer means located adjacent a rear portion of the towed section and having a sensitive axis perpendicular to the direction of forward movement of the vehicle for detecting left and right acceleration of the rear portion of the towed section and producing an output signal responsive thereto, coordinated turn detection means coupled to said towed section and producing a coordinated turn signal, combining means coupled to said accelerometer means and said coordinated turn detection means for distinguishing a proper maneuver from a jackknifing and skidding condition by combining said output signal with said coordinated turn signal to produce a first electrical signal responsive to detected acceleration to the left and a second electrical signal responsive to detected acceleration to the right, and coupling means for coupling said first electrical signal to the actuating means controlling the left wheel brake for applying a braking action only to the left wheel brakes and for coupling said second electrical signal to the actuating means controlling the right wheel brake for applying a braking action only to the right wheel brakes, whereby a differential braking action is achieved only for a jackknifing and skidding condition and not for a proper maneuver, and transducer means coupled between said accelerometer means and said combining means.

3,993,363

ANTI-LOCK VEHICLE BRAKE SYSTEMS

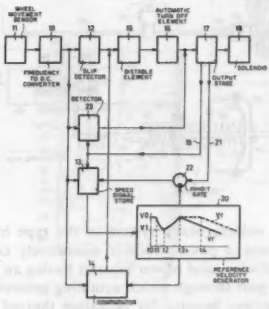
Derek Robert Skoyles, and Denis Sharp, both of East Grinstead, England, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Apr. 21, 1975, Ser. No. 569,978

Claims priority, application United Kingdom, May 2, 1974, 19310/74

Int. Cl.² B60T *8/02*

U.S. Cl. 303—21 P **14 Claims**

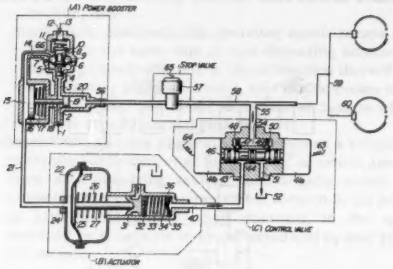


1. An electronic control circuit for an anti-lock vehicle brake system, said control circuit comprising, operating means responsive to an input signal having a quantity which is a function of wheel speed to produce an output signal for causing energisation of a solenoid valve when said quantity undergoes a change corresponding to a change in wheel speed at a rate in excess of a first predetermined rate of change of wheel speed and by an amount which is greater by a given percentage than its amount of change would have been had its change of wheel speed continued at said first predetermined rate of change, the latter corresponding to a reference rate of wheel deceleration, storage means also responsive to said input signal when said output signal is produced to store an initial reference velocity signal that has a predetermined relationship with the actual wheel speed to which the value of said quantity then obtaining corresponds, signal generating means responsive after a predetermined period following the initial storage of said reference velocity signal, for producing a generated signal corresponding to said initial reference velocity signal, said signal generating means initially decreasing the generated signal at a second predetermined rate of change of wheel speed greater than said first reference rate of wheel speed and for a variable period whose duration is a function of the initially stored reference velocity signal, said signal generating means then being responsive following said variable period to increase the generated signal at a third predetermined rate of change of wheel speed until it attains a predetermined value having a given relationship with the initially stored reference velocity signal, and said signal generating means then being further responsive following the attainment of said predetermined value by the generated signal to decrease the latter at a fourth predetermined rate of change of wheel speed, the control circuit further comprising comparative means responsive to said input signal to cause said operating means to terminate said output signal to cause solenoid de-energisation whenever said quantity assumes a value corresponding to a wheel speed having a given relationship with the prevailing value of the generated signal.

3,993,364
ANTI-SKID DEVICE FOR USE WITH VEHICLE BRAKE SYSTEMS

Haruo Chiba, Ageo, and Akiteru Fujiki, Omiya, both of Japan, assignors to Sanwa Seiki Mfg. Co. Ltd., Yono, Japan

Filed Feb. 18, 1975, Ser. No. 550,672
Int. Cl.² B60T *8/06*
U.S. Cl. 303—21 F **2 Claims**



1. In a vehicle brake system of the type having a master cylinder and a power booster operatively coupled to said master cylinder, said power booster having an actuating pressure inlet port through which actuating pressure is introduced into the power booster for actuation thereof in response to pressurized fluid from said master cylinder and having a brake pressure outlet port through which brake pressure is fed to the wheel cylinders of the vehicle in response to actuation of said power booster by the actuating pressure,

an anti-skid device comprising:

an actuator hydraulically connected in parallel with said power booster in the brake system for applying brake pressure to said wheel cylinders independently of said power booster when skidding occurs, said actuator being hydraulically communicated to said actuating pressure inlet port of the power booster,

a control valve interposed between said actuator and said wheel cylinders, said control valve being connected to receive said brake pressure from said actuator and being operable to interrupt communication between said actuator and said wheel cylinders when no skidding occurs and operable alternately to feed said brake pressure to the wheel cylinders to discharge brake pressure from the wheel cylinders into a reservoir when skidding occurs, and

a stop valve interposed between said brake pressure outlet port of said power booster and said wheel cylinders, said stop valve being operable to interrupt communication between said brake pressure outlet port and the wheel cylinders when skidding occurs.

3,993,365
ANTISKID CONTROL SYSTEM

Toshiyuki Kondo, Toyota, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Kariya, Japan

Filed Oct. 21, 1975, Ser. No. 624,393
Claims priority, application Japan, Dec. 29, 1974, 50-2980
Int. Cl.² B60T *8/06*
U.S. Cl. 303—21 F **10 Claims**

1. An antiskid control system comprising:

a. a braking hydraulic pressure source;

b. a power source;

c. wheel cylinders;

d. first passage means for connecting said braking hydraulic pressure source to said wheel cylinders;

e. computer means for detecting a locking condition of the wheels and for producing an indicating signal upon said detection;

f. control means actuated in response to said indicating signal from said computer means; and

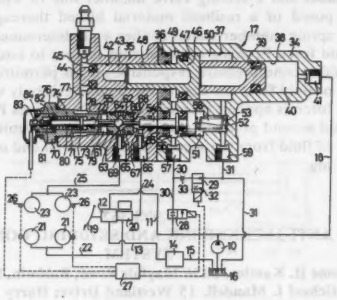
g. a hydraulic pressure control device provided in said first passage means and including:

i. a housing,

ii. means provided in said housing for varying the hydraulic pressure supplied to said wheel cylinders,

iii. second passage means for connecting said means for varying the hydraulic pressure supplied to the wheel cylinders to said first passage means,

iv. a single valve for selectively controlling both said first and second passage means,



v. first servo means communicable with said power source by said control means for actuating said means for varying the hydraulic pressure supplied to the wheel cylinders,

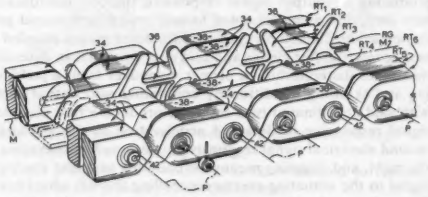
vi. second servo means communicable with said power source by said control means for actuating said single valve, and

wherein said valve includes two opposed valve seats formed at ends of said first and second passage means and a valve member normally positioned for closing said second passage means by said second servo means and positioned by said second servo means for closing said first passage means during a locking condition of the wheels.

3,993,366
VEHICLE TRACKS

Robert J. Orpana, Ste. Foy, Canada, assignor to Panatrac Manufacturing Corporation Ltd., Markham, Canada

Filed July 7, 1975, Ser. No. 594,139
Int. Cl.² B62D *55/20*
U.S. Cl. 305—35 R **8 Claims**



1. An endless track for a tracked vehicle, the track comprising:

a plurality of track elements including:

a. traction elements adapted for engagement with the ground in use and presenting upper road wheel contact surfaces; and,

b. guiding elements adapted to locate the track laterally in use;

means coupling together said track elements in an endless configuration, said means defining pivot axes which extend transversely of the track and which are arranged so that each said element is pivotable about two such axes located adjacent respectively opposite ends of the element;

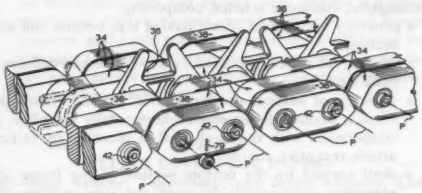
said traction elements being arranged in a plurality of parallel rows extending longitudinally of the track, and the track guiding elements being arranged in at least one row parallel to said rows of traction elements, the arrangement of the elements being symmetrical about a longitudinal median line of the track and at least two of said rows of traction elements being located on each respectively opposite side of said median line, whereby the road wheel contact area defined by the upper surfaces of said traction elements is symmetrical with respect to said median line so that, in use, the track is loaded symmetrically by road wheels on a vehicle to which the track is fitted.

3,993,367

GUIDING ELEMENT FOR A VEHICLE TRACK

Robert J. Orpana, Ste. Foy, Canada, assignor to Panatrac Manufacturing Corporation Limited, Markham, Canada

Filed July 7, 1975, Ser. No. 594,141
Int. Cl.² B62D *55/20*
U.S. Cl. 305—36 **7 Claims**



1. An endless track for a tracked vehicle, the track comprising:

a plurality of track elements including:

a. resilient traction elements adapted for engagement with the ground in use and presenting generally flat upper surfaces, the traction elements being arranged in a plurality of parallel rows which extend longitudinally of the track, and said generally flat upper surfaces of the elements defining portions of the track for contact by road wheels of a vehicle to which the track is fitted in use; and,

b. guiding elements adapted to locate the track laterally in use, said guiding elements being arranged in at least one row parallel to said rows of traction elements;

means resiliently coupling together said track elements in an endless configuration, said means defining pivot axes which extend transversely of the track and which are arranged so that each said element is pivotable about two such axes located adjacent respectively opposite ends of the element;

each said guiding element comprising a body which includes:

upwardly projecting guide means extending longitudinally of the body and defining laterally-disposed guiding surfaces for lateral location of the track, said guide means having inwardly angled ends to allow clearance for relative angular movement between similar elements located adjacent one another longitudinally of the track;

a lower ground-contact surface on the said body; and,

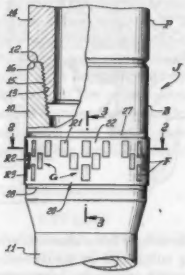
cylindrical track driving formations projecting to both sides of said body at the position of each of said axes and disposed concentrically with respect to said axes.

3,993,368

TOOL JOINT WEAR PROTECTORS

Rainer Jürgens, and Gerhard Exner, both of Celle, Germany, assignors to Christensen Diamond Products Company, Salt Lake City, Utah

Filed July 21, 1975, Ser. No. 597,478
Int. Cl.² F16C *29/00*
U.S. Cl. 308—4 A **26 Claims**



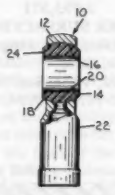
1. In a well pipe tool joint part comprising an elongated body having thread means at one end of the body for connection with a complemental tool joint part, and wear protector means extending circumferentially about said body in an axially extended region spaced from the end of said one body: the improvement wherein said wear protector means comprises hardfacing material distributed about said region more densely closest to said one end of said body and progressively less densely towards the other end of said body.

3,993,369

BEARING ASSEMBLY WITH DEFORMABLE INNER MEMBER

Albert R. McCloskey, Fairfield, Conn., assignor to Heim Universal Corporation, Fairfield, Conn.

Filed Apr. 23, 1975, Ser. No. 570,642
Int. Cl.² F16C *35/06*
U.S. Cl. 308—72 **10 Claims**



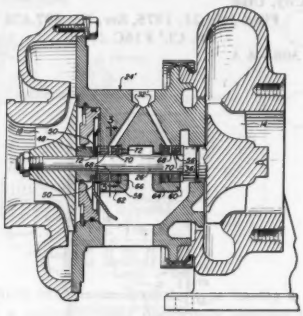
1. A self-aligning bearing assembly comprising an outer member having a concave inner surface and an inner member carried within said outer member and having a convex outer surface generally complementary to said concave inner surface, said inner member being a deformable plastic member, and deforming means to vary the tolerance between said inner and outer members.

3,993,370

LUBRICATED BEARING STRUCTURE

William E. Woollenweber, Columbus, Ind., assignor to Cummins Engine Company, Inc., Columbus, Ind.

Filed Mar. 27, 1974, Ser. No. 455,066
Claims priority, application United Kingdom, Apr. 6, 1973, 16522/73
Int. Cl.² F16C *1/24, 17/16, 33/66, 39/04*
U.S. Cl. 308—121 **8 Claims**



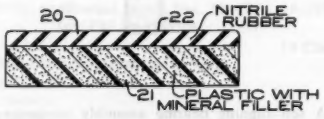
1. A bearing structure for a shouldered shaft rotating at high speed and being subjected to thrust forces applied thereto in both directions, said structure comprising a stationary member having a pair of longitudinally spaced journal sections adapted to surround portions of the shaft and being disposed to one side of a shaft shoulder, adjacent end portions of said sections being provided with inwardly projecting bearing surfaces, the opposite end of one section being disposed adjacent the shaft shoulder and the opposite end of the other section being disposed adjacent a thrust collar, said stationary member being provided with a passage for a lubricant, said passage being in communication with each journal section; and a pair of floating elongated sleeve bearings rotatably mounted within said journal sections, each sleeve bearing having an inner surface in proximity to and encompassing a shaft portion and an outer surface in proximity to an adjacent surface of a journal section, each sleeve bearing being provided with a first port means for the lubricant interconnecting the inner and outer surfaces thereof and being in communication with the lubricant passage, and a second port means for the lubricant interconnecting the end faces of said sleeve bearing and being in communication with the lubricant passage, said sleeve bearings being rotatable with said shaft but at a slower speed.

3,993,371

THIN RUBBER SURFACED BEARINGS

Roy L. Orndorff, Jr., Kent, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Filed July 22, 1974, Ser. No. 490,228
Int. Cl.² F16C *17/02, 17/14, 22/06, 33/22*
U.S. Cl. 308—238 **22 Claims**



1. A journal bearing having a plurality of journal-supporting longitudinal faces of elastomeric material separated by longitudinal lubricant passages, with the elastomeric material attached to an essentially rigid external backing, characterized in that each journal-supporting face has:

a. a surface shape between the limits of the curvature of the journal and a plane, and for a major part of its width has a radius of curvature substantially greater than the radius of the journal;

b. a circumferential width which is at most half of the diameter of the journal; and

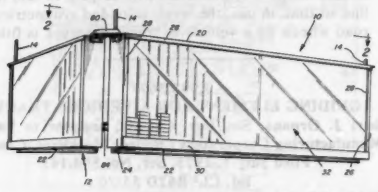
c. a thickness, between the journal-supporting surface and the rigid external backing, which is at most one-sixth of the width of the face.

3,993,372

OVERHEAD CIGARETTE RACK

Peter Mihos, 278 Spring St., Brockton, Mass. 01401

Filed July 25, 1975, Ser. No. 599,121
Int. Cl.² A47F *1/00, 7/00*
U.S. Cl. 312—42 **9 Claims**



1. A display and vending device for use with generally rectangular, stackable articles, comprising:

a generally rectangular frame having top, bottom and side sections;

a transparent panel supported by said frame and defining a back wall;

a plurality of vertical dividers carried by the frame, the vertical dividers being spaced horizontally to define, in cooperation with the back wall, a plurality of vertical article-receptive channels;

a shelf carried by the bottom section of the frame and extending substantially between the side sections, the shelf defining the bottom of each of said vertical channels, the shelf being of generally V-shaped, concave configuration having a rearward portion which extends forwardly and downwardly and a forward portion which extends forwardly and upwardly, the forwardmost portion of the shelf defining a lip extending forwardly of the dividers, and a plurality of cutout portions formed in the lip, the cutout portions being spaced along the lip there being one cutout portion associated with each of the vertical channels;

a horizontally extending bar mounted to the frame on the forwardly facing side thereof and extending from one side section to the other, the horizontal bar being disposed above the forwardly extending lip portion of the shelf and being disposed to engage articles stacked in any of the channels which may protrude forwardly beyond said bar and to urge said articles fully back into said channel as said stack of articles advances downwardly;

said V-shaped shelf being constructed so that the lowermost article in a stack thereof will protrude forwardly beyond those of the stacked articles below the horizontal bar.

3,993,373

DISPENSER WITH SUSPENDED CARRIER

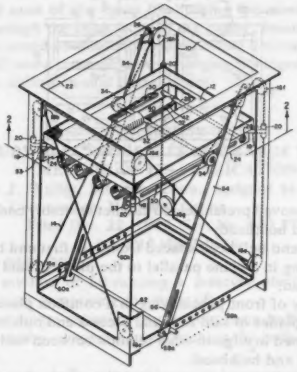
Daniel R. Vershbow, Newton, Mass., assignor to Serv-O-Lift Corporation, Dorchester, Mass.

Filed Sept. 24, 1975, Ser. No. 616,286
Int. Cl.² A47F *1/00;* **B65G** *1/16*
U.S. Cl. 312—71 **10 Claims**

1. In a dispenser comprising a frame having an open top, a carrier plate movable in said frame and accessible through said open top, a suspension system for maintaining said carrier

plate level at all positions thereof in said frame, and a biasing system for biasing said carrier plate toward said open top,

the improvement wherein said biasing system comprises a resilient biasing member which produces a biasing force that increases with increasing deformation of said biasing member from a base configuration and which is supported on said carrier plate for vertical movement there-



with, a deformer supported on said carrier plate for vertical movement with said carrier plate and for horizontal movement relative to said carrier plate and said biasing member, and a cam member supported on said frame and disposed to drive said deformer horizontally as said carrier plate moves downward thereby causing deformation of said biasing member.

3,993,374

FILLING DEVICE FOR PAPERS

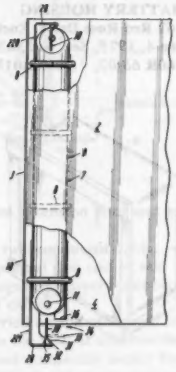
Karl-Heinz Schudy, Espelkamp, and Heinz Kleinert, Lubbecke, both of Germany, assignors to Robert Krause KG, Espelkamp, Germany

Filed Feb. 20, 1975, Ser. No. 551,802

Claims priority, application Germany, Sept. 24, 1974, 2445451; Jan. 17, 1975, 2501721

Int. Cl.² B42F *3/00*, *3/04*

U.S. Cl. 312—184 **7 Claims**



1. A filing device comprising a ring binding mechanism for attachment to the inside of a protective file cover having upper and lower edges, said ring binding mechanism having a sprung cover, ring carrying elements, and ring components carried pairwise by said ring carrying elements for rocking movements thereby allowing said ring binding mechanism to be opened and closed, a slide disposed at each longitudinal end of said ring binding mechanism, each of said slides being slidably mounted for limited longitudinal displacement along said ring binding mechanism between operative and inoperative positions, and a locking element on said slide engageable with said ring carrying elements to secure said ring components of said ring mechanisms against opening when said slide is displaced to said operative position, said locking element being disengaged from said ring carrying elements when said slide is disposed in said inoperative position such that said ring binding elements are free to be opened, an outer end of said slide comprising a suspension means which, in said operative position of said slide, extends beyond the corresponding longitudinal end of said ring mechanism and beyond said edges of said protective file cover, thereby enabling the device to be suspended from a file carrier, said suspension means being disposed substantially within said protective file cover when said slide is in said inoperative position, said suspension means being disposed substantially at the outer end of said slide and includes a flange element disposed at an angle to the plane of a main section of said slide, said flange element defining a support surface for suspending the filing device from said file carrier.

3,993,375

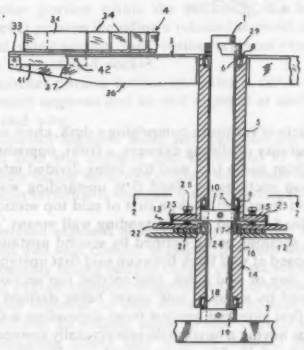
POWER DRIVEN ROTARY DATA STORAGE AND RETRIEVAL FILE

Frank Potter, 97 Birchwood Park Drive, Syosset, N.Y. 11791

Filed June 20, 1975, Ser. No. 588,815

Int. Cl.² A47B *53/00*; A47F *3/08*

U.S. Cl. 312—197 **6 Claims**



1. A power driven rotary data storage and retrieval file comprising a vertical stationary post, a collar fixed upon the post intermediately of the ends of the post, a wheel frame having a depending tubular hub slidably received upon an upper portion of the post and seated upon the collar in bearing relationship for rotation relative to the collar and the post, the collar serving to bear the load of the wheel frame, a motor driven sprocket wheel having a depending hub slidably received upon a lower portion of the post below the collar for rotation relative to the collar and the post, the hub of the wheel frame and the hub of the sprocket wheel being restrained against axial movement relative to the post, the hub of the wheel frame having an integral plate flange extending radially about its lower end, and a slip plate friction clutch drivingly engaging the sprocket wheel with the flange whereby rotation of the sprocket wheel about the post is translated into rotation of the wheel frame about the post, the clutch comprising an annular friction disc pad coaxial with the post seated upon an upper flat face of the sprocket wheel and

having rotation relative to the post, an upper clutch pressure plate resting upon the disc pad in coaxial relation to the post and having rotation relative to the post, means fixed upon the pressure plate having an interlocking driving engagement with the flange of the hub of the wheel frame, and screw elements threaded in the flange extending axially through the flange into abutment with an upper surface of the pressure plate, the screw elements pressurizing the pressure plate against the disc pad and as a consequence pressurizing the disc pad against the face of the sprocket wheel so that rotation of the latter is transmitted through the clutch to the wheel frame.

3,993,376

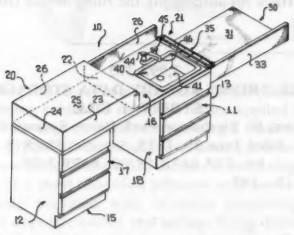
FURNITURE FOR CONCEALING A WASH BASIN

Horace S. Meldahl, P.O. Box 1, Charleston, W. Va. 25321

Filed Aug. 20, 1975, Ser. No. 606,067

Int. Cl.² A47B *77/06*; A47K *1/00*

U.S. Cl. 312—228 **1 Claim**



1. An article of furniture comprising a desk, chest or the like having a plurality of sliding drawers, a front, opposite sides, a back, a bottom and a top, said top being divided into at least a pair of top sections by fixed first upstanding wall means between said front and back, a first of said top sections being in part defined by said first upstanding wall means, a second of said top sections being defined by second upstanding wall means disposed at said back between said first upstanding wall means and one of said sides, said second top section further being defined by a cover, said cover being defined by a top panel and first side and second front depending wall means, hinge means having a horizontal axis pivotally connecting said cover to said article of furniture at said one side along said first depending wall means whereby said cover can be pivoted between a first position at which said cover is disposed sidewise away from said one side and a second position at which said cover overlies and covers a portion of said top and rests upon said first upstanding and second upstanding wall means thereby providing the appearance of a unitized immovable part of the article of furniture in conjunction with said first top section, and lavatory means within said second top section and concealed thereby when said second top section is in said second position, said first depending wall means comprising a triangular strip being attached to the end wall and under the edge of said cover to prevent water from accumulating in the exposed port area of the cover when said cover is pivoted to its upstanding opened position, the water being diverted by said triangular strip toward said lavatory, said first upstanding wall means and said first depending wall means are in generally parallel relationship to each other in said second positions; and said second upstanding wall means and said second depending wall means are in generally parallel relationship to each other.

3,993,377

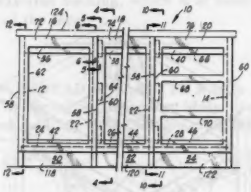
PREFABRICATED CABINET ASSEMBLY

John F. Montroy, 13124 St. Andrews Drive, Oklahoma City, Okla. 73114

Filed Sept. 22, 1975, Ser. No. 615,696

Int. Cl.² A47B *47/00*

U.S. Cl. 312—263 **13 Claims**



1. An improved prefabricated cabinet assembly comprising:

a first end bulkhead;

a second end bulkhead spaced from said first end bulkhead and lying in a plane parallel to the plane of said first end bulkhead;

a plurality of front panels lying in a common plane normal to the planes of said first and second end bulkheads and positioned in edge-to-edge relation between said first and second end bulkhead;

means for rigidly connecting said first end bulkhead to one of said front panels adjacent thereto;

means for rigidly connecting said second end bulkhead to another of said front panels adjacent thereto;

at least one intermediate bulkhead, lying in a plane parallel to the planes of said first and second end bulkheads and engaging a corresponding one of said front panels proximate the edge thereof and adjacent the edge of the next adjacent front panel;

means for rigidly connecting said intermediate bulkhead and said corresponding one of said front panels; and

means for rigidly connecting said intermediate bulkhead and the front next adjacent the front panel corresponding to said intermediate bulkhead, whereby said intermediate bulkhead, the corresponding front panel and the front panel next adjacent thereto are rigidly mutually connected with said corresponding front panel and the front panel next adjacent thereto in edge-to-edge relation.

3,993,378

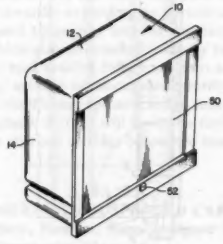
BATTERY HOUSING

Clyde C. Berkus, 3467 Red Rose Drive, Encino, Calif. 91361

Filed June 4, 1975, Ser. No. 583,536

Int. Cl.² B60R *68/02*, *11/00*; H01M *2/10*

U.S. Cl. 312—293 **4 Claims**



1. A housing for a storage battery to be mounted in a camper, or the like, comprising: a rectangular casing having an open front and formed of impervious plastic material to have integral bottom, top, side and rear walls, said casing having integral ribs respectively formed on the inner surfaces

of the side walls thereof and said ribs being displaced up from said bottom wall, said casing forming hinge means on the upper edge of said open front; a battery shelf; a plurality of upright vanes positioned in spaced parallel relationship under the shelf slidably to support the shelf on the bottom wall of the casing under the ribs to permit the shelf to be movable out through the open front of the casing; bracket means formed on the bottom wall of the casing in position to be engaged by selected ones of the vanes for limiting the movement of the shelf through the open front of the casing; means including a strap mounted on the shelf for supporting a storage battery on the shelf; and a removable door hanging in hinged relationship with the casing on said hinge means.

3,993,379

MERCURY ELECTRODELESS DISCHARGE LAMP AND METHOD OF ITS FABRICATION

William J. Waller, Monroe, Conn., assignor to The Perkin-Elmer Corporation, Norwalk, Conn.

Filed Dec. 22, 1975, Ser. No. 643,375
Int. Cl.² H01J *9/38*
U.S. Cl. 316—20 **5 Claims**

2. A method of fabricating a mercury electrodeless discharge lamp comprising the steps of:

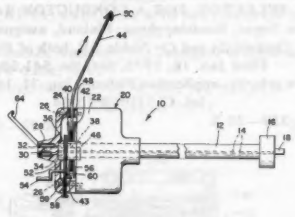
a. providing a radiation transparent lamp bulb;
b. cleansing, evacuating and flushing the bulb with a noble gas;
c. filling the bulb with noble gas at low pressure;
d. introducing a small quantity of mercuric oxide into the bulb;
e. heating the bulb indirectly to a temperature below the decomposition point of mercuric oxide;
f. filling the bulb to the desired pressure with noble gas; and
g. sealing off the bulb.

3,993,380

COMBINED EXTENSION CORD AND GROUNDING DEVICE

Benjamin Lumm, Jr., Bay Shore, N.Y., assignor to Lawrence Peska Associates, Inc., New York, N.Y., a part interest

Filed Jan. 21, 1976, Ser. No. 651,026
Int. Cl.² H01R *3/06*
U.S. Cl. 339—14 RP **1 Claim**



1. A combined extension cord and grounding device comprising:

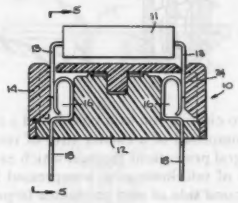
an elongated two conductor cable;
a connector plug at one end of said cable having two projecting prongs respectively connected to said two conductors of said cable;
a housing carried on the other end of said cable;
an aperture in the wall of said housing;
a three element connector socket formed on said housing having a pair of socket elements respectively connected to said two conductors of said cable and a ground socket element;
a reel mounted rotatably within said housing;
a grounding wire having the end connected to said ground socket element, said grounding wire passing from said ground socket element and wound about said reel, a free end of said grounding wire exiting said housing via said aperture; and
means carried by said housing for rotating said reel.

3,993,381

INTERMEDIATE CONNECTOR

Stephen Horbach, 40 Glen Road, Mountain Lakes, N.J. 07046

Continuation-in-part of Ser. No. 521,049, Nov. 5, 1974, abandoned. This application July 18, 1975, Ser. No. 597,397
Int. Cl.² H05K *1/04*
U.S. Cl. 339—17 CF **4 Claims**



1. In an intermediate connector to provide engagement between a printed circuit board having terminal openings and an integrated circuit or the like having terminals, the intermediate connector having a housing containing at least one pocket therein, the improvement in a terminal comprising:

a unitary, reilient, wire having a first end and a second end,
a prong portion at the first end of said wire, said prong portion extending from below said housing into said housing,
a pocket portion within the pocket of the housing, said pocket portion including a retainer segment connected to said prong portion, said retainer segment extending along the floor of said pocket,
said pocket portion further including a curved segment, a contact segment and an end segment at said second end of said wire,
said contact segment being between said curved segment and said end segment and positioned to have an outwardly facing surface in contact with whatever integrated circuit terminal is inserted into the intermediate connector,
said curved segment positioned between said retainer segment and said contact segment, pressure normal to said outwardly facing surface of said contact segment causing said curved segment to increase its curvature,
said end segment, at said second end of said wire, turned inward at an oblique angle to said contact segment and terminating above said retainer segment at a distance from said retainer segment substantially less than the least thickness of said wire,
said pressure normal to said outwardly facing surface of said contact segment causing said end segment to move, said second end terminating above said retainer segment a distance sufficiently great so that said second end will clear said retainer segment when so moved.

3,993,382

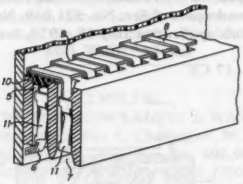
MOISTURE SEAL FOR ELECTRICAL INTERCONNECT SYSTEM

Elvin E. Brown, Cedar Rapids, Iowa, assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Dec. 10, 1971, Ser. No. 206,831
Int. Cl.² H05K *1/02*
U.S. Cl. 339—17 LC **1 Claim**

1. An electrical interconnect system comprising: a printed circuit board; an elongated dielectric housing mounted on said board and having an inner and outer row of cavities therein; a plurality of electrical contacts located within cavities in said

inner row, each said contact of said inner row having an integral part thereof extending from a first side of said housing and electrically connected to circuitry on said board; a plurality of electrical contacts located within said cavities in said outer row, each contact having an integral tab extending from a second side of said housing opposite said first side, said tab overlying one of the cavities in said first row and electrically



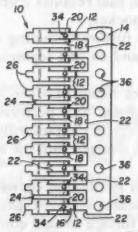
connected to circuitry on said board; and a resilient electrical insulator, comprised of a carrier strip of resilient soft rubber having integral projections thereon which extend into each of the cavities of said inner row, compressed between said tab and said second side of said connector to provide a moisture seal and electrical insulator between said tab and the contact in the cavity underlying said tab.

3,993,383

PRINTED CIRCUIT ELECTRICAL CONNECTORS

Vincent Marino, 7 Jacqueline Court, Port Jefferson Station, N.Y. 11776

Filed June 2, 1975, Ser. No. 583,191
Int. Cl.² H05K *1/07*
U.S. Cl. 339—17 L **4 Claims**



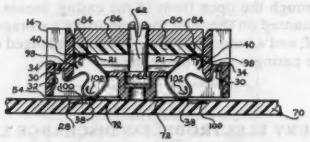
1. Improved printed circuit electrical connectors comprising, in combination, an elongated planar strip tab having positioning indicia in repeating relation therealong, a body having plural three-contact electrical connectors formed integral with said strip tab, two of said three contacts thereof being relatively spaced from each other and detached from said strip tab and bent out of the plane thereof, said third contact thereof being in the space between said two contacts and out of the plane of said two contacts and being detachably connected to said strip tab and lying in the same plane thereof, said third contact having a dimple-shaped circuit-completing means thereon to engage within and prevent relative movement between a respective connector and a printed circuit board engaged therewith, said third contact being in an aligning relation with a cooperating positioning indicia on said strip tab, whereby said strip tab facilitates the positioning of multiples of said electrical connectors and contributes to the accuracy thereof by the registry between said circuit-completing means and positioning indicia, and a mounting tab on said body extending therefrom in a direction opposite and remote from said three contacts and being movable relative thereto to mount and position said contacts at any desired angle relative to a printed circuit board.

3,993,384

CONNECTOR BLOCK

Richard Kay Dennis, Etters, and Edward Leal Hadden, Mechanicsburg, both of Pa., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed May 12, 1975, Ser. No. 576,450
Int. Cl.² H05K *1/12*
U.S. Cl. 339—17 CF **9 Claims**



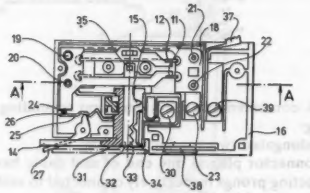
1. A connector block for forming electrical interconnections between pairs of spaced contact pads or the like, said connector block comprising an insulating housing, a series of terminal recesses in the housing, a first and a second opening in each recess communicating the interior of the recess with the exterior of the housing and a surface to one side of the first opening; a terminal in each recess, each terminal being formed from a length of spring metal and including first and second bowed contacts extending outwardly of the housing through said first and second openings respectively, a toggle linkage joining said contacts and including a pair of toggle legs and an elbow, each leg extending from one contact to the elbow, a portion of the terminal adjacent the first contact engaging said surface during collapse of the linkage, the elbow being located on the side of a straight line joining said contacts away from said surface so that when the toggle linkage is collapsed by movement of a contact pad engaging the first contact toward the recess, the elbow is moved away from the line; and the housing including a fixed terminal guide surface in each recess facing the second opening thereof and engagable with the toggle linkage upon collapse of the linkage to force the second contact along the surface of a fixed contact pad adjacent the second opening to form a wiped electrical connection therebetween.

3,993,385

CURRENT COLLECTOR, PROVIDED WITH A SELECTOR, FOR A CONDUCTOR RAIL

Leif Sven Seger, Ruotsinpyhtaa, Finland, assignor to A. Ahlstrom Osakeyhtio and Oy Nokia AB, both of Finland

Filed Jan. 16, 1975, Ser. No. 541,604
Claims priority, application Finland, Jan. 31, 1974, 274/74
Int. Cl.² H01R *13/54*
U.S. Cl. 339—21 R **5 Claims**



1. A current collector for a conductor rail of the type having a plurality of separate longitudinally extending conductors, which current collector comprises a frame; at least three electrical contact fingers each supported on said frame for movement relative thereto between a retracted position out of engagement with a corresponding conductor of said rail, and a protruding position of engagement with said corresponding conductor; a camshaft member supported on said frame for

axially slidable and rotary movement relative thereto; and cams on said camshaft member positioned to selectively engage respective contact fingers according to the axial position of the camshaft member and to move such contact fingers from their respective retracted positions to their respective protruding positions to engage corresponding conductors of said rail.

3,993,386

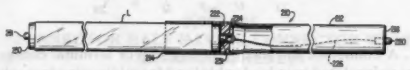
LAMP ENERGY SAVING SPACER

Lacy A. Rowe, 1851 Skycoe Drive, Salem, Va. 24153

Filed Sept. 2, 1975, Ser. No. 609,607

Int. Cl.² H01R *33/08*

U.S. Cl. 339—50 R **10 Claims**



1. An adapter for use with a fluorescent light tube of a predetermined length to permit the fluorescent light tube to be installed in a fluorescent light fixture having spaced sockets therein which normally require a fluorescent light tube of greater length than said predetermined length of the fluorescent light tube to span the distance between said sockets, said adapter comprising an elongated hollow tube having a closed end portion for mounting in one socket of a fluorescent light fixture and an open end socket portion for snugly and slidably receiving one end of said fluorescent light tube, a transverse partition secured within said elongated hollow tube intermediate the ends thereof, spaced therefrom and separating said open end portion and said closed end portion, said partition having contact means mounted therein for making electrical contact with contact means on one end of a fluorescent light tube when said one end of the fluorescent light tube is inserted in said open end socket portion, said closed end portion having an end wall with contact means mounted therein, said contact means in said end wall being duplicative of and adpated for reception and electrical connection in the same socket as the contact means at said one end of said fluorescent light tube, and conductor means passing through a region of space between said partition and said end wall and connecting the contact means in said transverse partition with the contact means in said end wall.

3,993,387

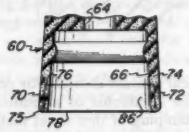
ELECTRICAL CONNECTOR AND METHOD OF MAKING SAME

J. William Venezia, Andover, N.J., assignor to Amerace Corporation, New York, N.Y.

Filed Nov. 25, 1974, Ser. No. 526,613

Int. Cl.² H01R *13/52*

U.S. Cl. 339—59 R **25 Claims**



15. An electrical connector element comprising an inner sleeve-like insert of conductive elastomeric material serving as an internal shield, the insert having terminal ends, at least one of said terminal ends being located at a fold in a wall portion folded upon itself, said fold establishing said one terminal end, and said wall portion including a terminal edge spaced from said terminal end in the direction along the insert toward the other terminal end, and an outer member of insulating elastomeric material, said member of insulating elastomeric material being joined to said insert in such manner that the juncture therebetween is continuous and void-free, including the portion of said juncture between said member of insulating material and said corresponding one terminal end of the insert.

3,993,388

CABLE CONNECTION FOR ELECTRICAL EQUIPMENT, PARTICULARLY ILLUMINATION EQUIPMENT ON BICYCLES

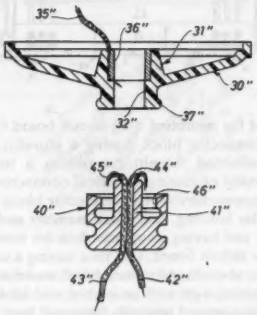
Hubert Konzorr, Unna, Germany, assignor to Union, Sils, van de Loo & Co., Frondenberg, Ruhr, Germany

Filed June 12, 1975, Ser. No. 586,238

Claims priority, application Germany, June 22, 1974, 2430061

Int. Cl.² H01R *13/40*

U.S. Cl. 339—59 L **14 Claims**



1. A cable connector in electrical equipment, particularly lighting equipment for bicycles, comprising an insulator; a contact member fastened in said insulator; at least one outside conductor leading to the exterior of said equipment; and an inside conductor leading to the interior of said equipment, said outside and inside conductors being held in electrical contact under stress by said contact member, the clamping of said outside conductor being independent of the point of contact with said contact member; and a stressing member connected to said insulator, said outside cable being jammed between said insulator and said stressing member at a location spaced from the point of electrical contact of said outside conductor.

3,993,389

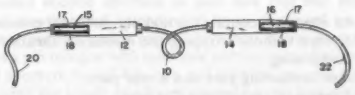
PATCH CORD

James C. Deitch, Bloomington, Minn., assignor to Magnetic Controls Company, Minneapolis, Minn.

Filed Sept. 15, 1975, Ser. No. 613,432

Int. Cl.² H01R *17/18*

U.S. Cl. 339—91 R **5 Claims**

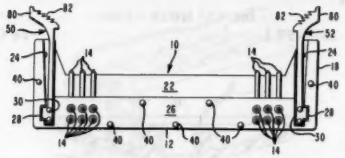


1. An intermediate patch cord connector for connecting together a first patch cord which has a standard plug on one end and a first needed connector on the other end and a second patch cord which has a standard plug on one end and a second needed connector on the other end, said intermediate patch cord comprising a cord electrically connecting together a pair of standard plug receiving jacks, said jacks including plug retaining means and in which said jacks each comprise a housing adapted to contain electrical contact springs therein connected at one end to said cord and positioned to make resilient contact with a standard plug inserted through a hole in said housing.

3,993,390
HEADERS WITH INSERTABLE LATCH MEMBERS

George Thomas Eigenbrode, Mechanicsburg, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Mar. 12, 1975, Ser. No. 557,578
Int. Cl.² H01R 13/54
U.S. Cl. 339—91 R 10 Claims

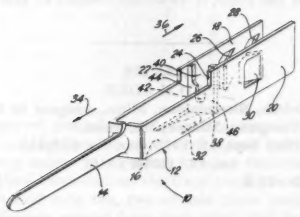


1. A header for mounting on a circuit board for removably receiving a connector block having a plurality of electrical connectors mounted therein comprising a block member having a plurality of mating electrical connectors therein for mating with connectors on the connector block and a generally rectangular housing, said block member and said housing being unitary and having a coplanar face for mounting against a surface of a circuit board, said face having a cavity opening onto said face at each end of said block member, each cavity having a common wall with an end of said block member, a recessed surface spaced inwardly from said face, and a second wall spaced from and opposite said common wall, said second wall having a rectangular channel extending therein from said face.

3,993,391
ELECTRICAL CONTACT FOR STRIPLESS CABLE CONNECTIONS

Jean-Claude Vernerey; Roman J. Komorowski, and Gilles F. A. Tournier, all of Colomiers, France, assignors to ITT Industries, Inc., New York, N.Y.

Filed Sept. 19, 1975, Ser. No. 614,839
Int. Cl.² H01R 11/20
U.S. Cl. 339—97 R 3 Claims

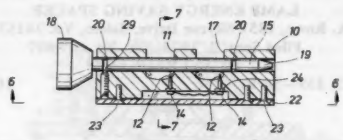


1. An electrical contact for making electrical connection to a cable core without stripping the insulation sheath from the core comprising:
- a front contacting part and a rear part;
- said rear part including a flat base;
- stripless cable connection means comprising a fork cut from said base and bent upwardly therefrom, said fork including a pair of spaced branches defining opposed insulation-severing core penetrating jaws; and
- an outwardly bent rearwardly extending contact retention tongue cut from said base and having a configuration complementary to the opening defined between said branches of said fork, said tongue lying within said opening prior to bending said fork upwardly from said base whereby said tongue and fork may be formed by a single cutting operation.

3,993,392
CONNECTOR

Otice E. Brown, and Richard D. White, both of El Paso, Tex., assignors to Globe Universal Sciences, Inc., Houston, Tex.

Filed Nov. 6, 1975, Ser. No. 629,449
Int. Cl.² H01R 9/08
U.S. Cl. 339—98 3 Claims

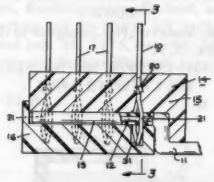


1. A connector for making in-line, tap or terminal connections to insulated twin lead cable, and for minimizing transmission noise and cross talk problems in said connections, comprising:
- a nonconductive base having at least one slot of predetermined width and depth to accommodate the cable;
- conductive contact pins in said base, said pins extending into said slot and being of a predetermined length and at a predetermined distance apart, for piercing the insulation of the cable to make conductive contact;
- a nonconductive rod, movable through an opening in said base, transverse to and communicating with said slot, said rod being movable from an inoperative position allowing insertion of a cable, to an operative position after insertion of a cable, said rod in its operative position being at a distance from said pins to urge the cable against said pins to pierce the insulation and to make conductive contact; and
- retaining means for holding said rod in said base in either its operative or inoperative position.

3,993,393
ROUND CONDUCTOR FLATCABLE CONNECTOR

Sidney V. Worth, Flourtown, Pa., assignor to Continental-Wirt Electronics Corporation, Warminster, Pa.

Filed Oct. 8, 1975, Ser. No. 620,573
Int. Cl.² H01R 9/08
U.S. Cl. 339—99 R 13 Claims



1. An electrical contact element for connection to an insulated round wire conductor of a multi-conductor flat cable comprising a stamping of thin sheet metal having a flat base part integrally provided at one end thereof with a pair of freely extending sharply pointed tines adapted to pierce the conductor insulation cross-wise of the conductor, said tines being oppositely bent out of the plane of said base part and individually bent to respectively provide the same with angularly related upper and lower portions bridged by flat central portions disposed in parallel planes respectively offset to either side of the plane of said base part, said upper portions of said tines being respectively integrally connected to said base part of said contact element and said lower portions of said tines being respectively provided with freely extending sharply pointed insulation-piercing extremities which converge toward each other to commonly present their points in said

plane of said base part, the opposed inner edges of at least said central portions of the tines as measured in a flat plane paralleling said parallel planes being uniformly spaced apart a distance less than the diameter of the conductor engaged thereby and respectively provided with sharp cutting corners which engage and cut into diametrically opposite sides of the conductor wire at two points relatively offset from one another along the longitudinal axis of the conductor wire for imparting a bending moment thereto whereby to place the latter under tension in the region of its engagement by said tines and thereby establish a force which reacts against the restrained tendency of the conductor to assume a straightened condition.

3,993,394

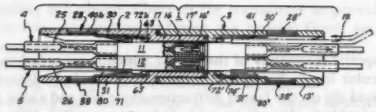
CONNECTOR HALF HAVING CONNECTOR WAFER RETAINED THEREIN

James Brand Cooper, Los Altos, Calif., assignor to Raychem Corporation, Menlo Park, Calif.

Continuation of Ser. No. 493,392, July 31, 1974, abandoned. This application Dec. 17, 1975, Ser. No. 641,486

Int. Cl.² H01R 13/42

U.S. Cl. 339—136 M **9 Claims**



1. In a connector half including a connector shell of the general type having first and second parallel, transverse faces joined by perpendicular side walls to provide a substantially rectangular cross section, said transverse walls having inner and outer faces, said connector shell having a forward portion and a rear portion and having a front end for mating with another connector half and having a rear end, and further comprising a connector wafer of substantially the same rectangular cross section of said connector shell, said connector wafer including connector contacts at a front end thereof, said connector wafer being for disposition such that said connector contacts are adjacent said front end of said connector shell, the improvement comprising, in combination:

resilient retaining means comprising a spring clip having a first transversely disposed leg mounted to said connector shell and a second, forward leg of substantially flat and rectangular shape cantilevered therefrom, said forward leg being contilevered from a point on an interface of one of said transverse walls and extending forwardly and into a cavity defined by said transverse walls and said side walls toward the front of said connector shell;

an aperture located in the rear portion of one of said transverse walls of said connector shell for insertion of said spring clip therein, and further in which seating means are provided in said connector shell for locating said first leg of said spring clip and aligning said second forward leg of said spring clip within said connector shell;

engaging means formed in said connector shell for limiting the forward movement of said connector wafer therein;

a transverse rib formed on a surface of said connector wafer facing an inner surface of said connector shell, said transverse rib comprising a forward camming surface and a rear shoulder, said transverse rib and said resilient means and said engaging means being disposed with respect to each other such that when said wafer is inserted in said connector shell in an axial direction, said forward camming surface cams the leg of said resilient retaining means, and in a final position in which said engaging means engages said wafer preventing forward movement thereof, said leg of said resilient retaining means is positioned behind said rear shoulder of said transverse rib such that upon a predetermined amount of rearward motion of said wafer, the end of said resilient retaining means engages said rear shoulder of said transverse rib, whereby said wafer is retained in said connector shell.

3,993,395

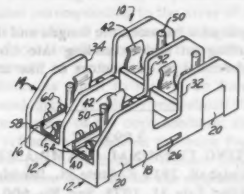
MODULAR SNAP-TOGETHER FUSE BLOCK ASSEMBLY

Philip W. Taylor, Howell, Mich., assignor to Taylor Industries, Inc., Howell, Mich.

Filed Jan. 6, 1975, Ser. No. 538,792

Int. Cl.² H01R 9/16

U.S. Cl. 339—198 H **3 Claims**



1. A fuse holder sectional assembly for mounting a plurality of individual fuse enclosures in locking side-by-side relationship on a plane mounting surface comprising at least one insulating partial enclosure element including a fuse mounting base portion and a single integral upwardly extending sidewall portion, a separate insulating upwardly extending end barrier wall element, at least one opening in said base portion for accepting a fastener for mounting thereof upon said plane mounting surface, and complementary interlocking means integrally formed on each lateral surface of said partial enclosure element and on a lateral surface of said into wall element, said complementary interlocking means comprising a female dovetail engagement pocket disposed in one of said lateral surfaces, a mating male dovetail engagement prong disposed on the other said lateral surface for slidable vertical engagement into said female dovetail pocket, a tongue projecting from one said lateral surface, and a mating recess in the other said lateral surface for accepting said tongue for causing said tongue and said mating recess to lockingly snap into registry when a pair of said elements are united with the bottom surface of said base portion engaged with said plane mounting surface, a pair of symmetrically disposed fuse clip and terminal integral members, each of said fuse clips and terminal integral members being mounted on said fuse mounting base by means of a mounting lug integral with said mounting base projecting through a first aperture in said fuse clip and terminal member, said mounting lug having an enlarged head portion formed after placing said fuse clip and terminal integral member on said base portion with said mounting lug engaged through said first aperture, a terminal screw threading through a threaded second aperture in said fuse clip and terminal integral member and extending in to an elongated recess in said base portion, and a pair of fuse stop means each in the form of a pin integral with said base portion extending through a third aperture in said fuse clip and terminal integral member for limiting the length of a fuse disposed on said fuse mounting base portion.

3,993,396

CONNECTOR BLOCK

George Thomas Eigenbrode, Mechanicsburg, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

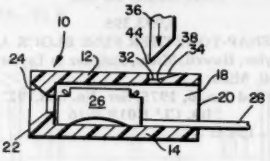
Filed Jan. 12, 1976, Ser. No. 648,512

Int. Cl.² H01R 13/40

U.S. Cl. 339—220 R **8 Claims**

1. A block molded of a rigid filled plastic material for receiving connectors or like articles; including an exterior wall;

a pair of cavities extending into the block beneath the exterior wall; a side wall between the cavities; and a rigid locking tongue integrally joined to the exterior wall adjacent the cavity open ends and extending away therefrom into both cavities, an integral joint between the tongue and the side wall, the tongue including an end extending into both cavities and blocking withdrawal of connectors or like articles from the cavities.

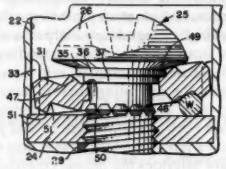


3,993,397

TILTING TERMINAL CLAMP ASSEMBLY

Charles E. Gutshall, 2911 E. State St., Rockford, Ill. 61108

Filed July 31, 1975, Ser. No. 600,886
Int. Cl.² H01R 9/10
U.S. Cl. 339—246 **12 Claims**



1. A tilting terminal clamp comprising:

a threaded shank having a head at one extremity and an entering end portion at the other extremity, said head being configured to cooperate with a tool whereby the shank may be rotated into or out of a threaded aperture,

a clamping plate having a central aperture adapted to receive said shank, said aperture having a size and configuration such as to permit said plate to teeter on said shank and to permit independent relative rotation of said plate and said shank, said plate having a generally circular perimeter with said perimeter being equipped with circumferentially spaced apart serrations adapted to engage the side wall of a terminal body pocket receiving said clamp to prevent rotation of said clamping plate, and

means for retaining said plate on said shank adjacent said head.

3,993,398

DEVICE FOR RECONSTRUCTING COLOR HOLOGRAPHIC IMAGE

Masaru Noguchi, and Shingo Ooue, both of Asaka, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed July 25, 1975, Ser. No. 599,038
Claims priority, application Japan, July 26, 1974, 49-86200
Int. Cl.² G03H 1/24
U.S. Cl. 350—3.5 **8 Claims**

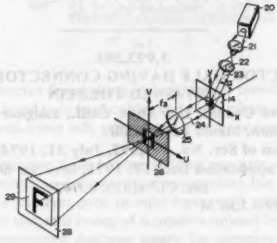
1. A device for reconstructing a color image from a color image hologram having no effect of diffusion comprising

a white light source which generates a white light beam containing light components of a plurality of wavelengths,

first optical means for directing said white light beam to a color image hologram at an angle corresponding to the angle at which a reference light beam was incident in the hologram recording process to make the color image hologram.

second optical means for focusing a primary diffraction light beam from said color image hologram on a focusing plane,

a spectrum selecting means located on said focusing plane, said spectrum selecting means comprises a slit having a width corresponding to the width of the band of the spatial frequency of the object which is recorded in said color image hologram, a red filter provided adjacent to said slit on the larger diffraction angle side and a blue filter provided adjacent to said slit on the smaller diffraction angle side, and



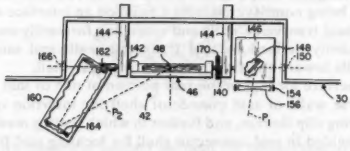
a diffusion projection screen located behind said spectrum selecting means to visualize a color image which is holographically reconstructed by said primary diffraction light beam.

3,993,399

UNIVERSAL HOLOGRAPHIC OPTICS ORIENTATION ASSEMBLY

Jerold L. Jacoby, and James E. Wright, both of Long Beach, Calif., assignors to TRW Systems and Energy, Redondo Beach, Calif.

Filed July 24, 1975, Ser. No. 598,899
Int. Cl.² G03H 1/02; G02B 7/02; G03B 5/06
U.S. Cl. 350—3.5 **9 Claims**



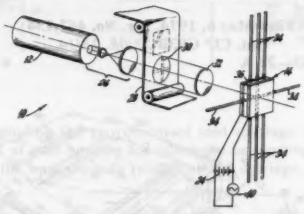
1. A holographic optics orientation device comprising:

a pivotal assembly having a pivot axis and including first optical means for receiving a holographic scene beam along said axis and directing the beam along a path transverse to said axis to provide an illuminated holographic recording field in front of said assembly, means for positioning a holographic recording medium to receive reflected scene beam light from a subject in said field, and second optical means for receiving a holographic reference beam along said axis and directing the latter beam toward said medium to illuminate the latter, and pivot means for mounting said assembly for rotation about said axis.

3,993,400
METHOD AND APPARATUS FOR FORMING ERASABLE, REAL TIME, OPTICAL CIRCUITS

Kenneth G. Leib, Wantagh, N.Y., assignor to Grumman Aerospace Corporation, Bethpage, N.Y.

Filed Feb. 14, 1975, Ser. No. 550,040
Int. Cl.² G02B 5/14
U.S. Cl. 350—96 C 41 Claims



1. A method of providing real time optical channels and components for interconnecting optical fibers coupled to a transducer, comprising the steps of:

coupling the optical fibers to the transducer to provide an air free connection between the optical fibers and the transducer;

generating the light beam;

directing the light beam toward the transducer;

controlling the transmission of the light beam to expose a predetermined portion of the transducer in accordance with a perdetermined pattern;

optically interconnecting the optical fibers in accordance with the predetermined pattern upon exposure of the transducer to the light beam; and

subsequently erasing the optical interconnection between the optical fibers.

3,993,401
RETROREFLECTIVE MATERIAL INCLUDING GEOMETRIC FRESNEL ZONE PLATES

Wolfgang H. Strehlow, Woodbury, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Feb. 10, 1975, Ser. No. 548,440
Disclosure was also published under second Trial Voluntary Protest Program on Feb. 3, 1976
Int. Cl.² G02B 5/12
U.S. Cl. 350—320 2 Claims

1. A method of making a retroreflective material comprising the steps of

generating an original fresnel zone plate image consisting of alternately opaque and transparent circular annuli whose radii are given by the formula

$$r_n = (f\lambda n)^{1/2},$$

wherein n takes on consecutive integer values beginning with 1, f is the focal length and λ is the wavelength of light;

recording in a photosensitive medium a photoreduced image of said original image;

changing the position of the photosensitive medium with respect to the recording means and repeating the recording step to provide an array of said photoreduced images in the photosensitive medium to define an array of fresnel zone plate images;

developing said photosensitive medium to provide an array of fresnel zone plates;

using the developed photosensitive medium to make a stamper for embossing an array of phase modulated fresnel zone plates corresponding to the array of fresnel zone plates in the developed photosensitive medium and having a given focal length associated therewith;

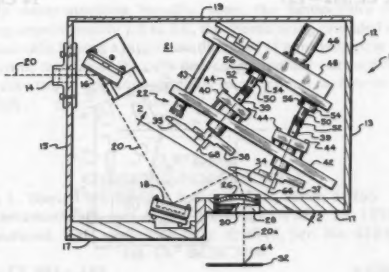
using said stamper to emboss transparent copy medium having a thickness equal to said given focal length to provide a said array of phase modulated fresnel zone plates at one surface of the copy medium; and

positioning a reflective surface in the back focal plane of said array of phase modulated fresnel zone plates by coating a reflective material on the opposite surface of the copy medium.

3,993,402
APPARATUS FOR DIRECTING A LASER BEAM

William G. Fredrick, Jr., Ann Arbor, Mich., assignor to Photon Sources, Inc., Livonia, Mich.

Filed Oct. 29, 1974, Ser. No. 518,249
Int. Cl.² G05D 25/00
U.S. Cl. 350—285 8 Claims

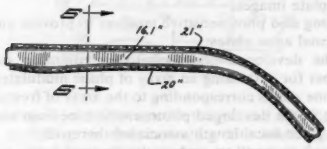


7. Apparatus for directing a single laser beam from a known path to a plurality of predetermined different paths extending in different directions comprising a plurality of mirrors, a plurality of rotatable shafts eccentrically supporting said mirrors in positions in which each of said mirrors is rotatable into a position intersecting said known beam path, said mirrors being arranged relative to said known beam path so that each mirror is in a different angular relation with respect to said path than another one of said mirrors when each mirror is positioned to intersect said path, and means for rotating said shafts through a cycle in which said mirrors sequentially intersect said laser beam path thereby directing said laser beam in predetermined different directions.

3,993,403
INSULATED FITTING SHEATH FOR EYEGLASS TEMPLES

Roderick B. Brown, 820 Thompson Ravine Road, Mankato, Minn. 56001

Filed Apr. 4, 1975, Ser. No. 565,220
Int. Cl.² G02C 5/14
U.S. Cl. 351—178 **4 Claims**



1. A method for forming a sheath for encasing heat-softened eyeglass temples, comprising:

a. providing a length of knit fabric;

b. doubling back the fabric upon itself to form a lengthwise fold;

c. stretching the fabric in the direction of the fold, and while maintaining the fabric in its stretched condition;

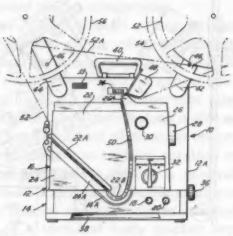
d. fastening the mating edges of the fabric together to form a seam running substantially parallel to the bend

whereby, when the stretching force is removed, the sheath assumes a bent orientation with the seam at the outer periphery of the bend.

3,993,404
SELF-THREADING MOTION PICTURE PROJECTOR

Roger W. Coomer, Simsbury; Ray L. Marquis, Blookfield, and Frank H. Beckman, New Britain, all of Conn., assignors to Kalart Victor Corporation, Plainville, Conn.

Filed Oct. 29, 1974, Ser. No. 518,780
Int. Cl.² G03B 1/56
U.S. Cl. 352—157 **14 Claims**



1. A self-threading motion picture projector comprising in combination, a loading slot for accepting filmstrip, a film gate, an upper sprocket, a lower sprocket, a magnetic-clutch-actuated drive for a supply reel, a magnetic-clutch-actuated drive for a take-up reel, an upper loop forming means, a lower loop forming means, a sound drum wrap means, a reversible drive train, and an improved control system comprising:

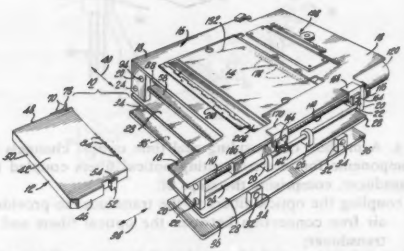
a. a first control means having two positions, a first position permitting the film in the loading slot to clear the upper and lower sprockets, and a second position for actuating the upper and lower loop forming means and for engaging the film to the upper and lower sprockets and

b. a second control means having three positions, a first position for actuating the drum wrap means, energizing the drive train in the forward direction, and energizing the magnetic clutch of the take-up reel drive; a second position for releasing the sound drum wrap means, energizing the drive train in the reverse direction, and energizing the magnetic clutch of the supply reel drive; and a third position for de-energizing the drive train and energizing for a timed brief period one of the magnetic clutches with a braking voltage.

3,993,405
APPARATUS FOR VIEWING A PRESELECTED ONE OF A PLURALITY OF MEDIA STORED IN A CONTAINER

William C. Kinsinger, New York, and James Ippolito, Bronx, both of N.Y., assignors to Metagraphic Systems, Inc., Bronx, N.Y.

Filed May 6, 1974, Ser. No. 467,134
Int. Cl.² G03B 23/08, 23/14
U.S. Cl. 353—27 A **41 Claims**



1. Apparatus for transferring a preselected one of a plurality of media from a container housing said media to a viewing area; said apparatus comprising:

a frame, said frame having a viewing area associated therewith;

first means including a carriage operatively associated with said frame for moving a container housing a plurality of information containing media between first and second positions which includes said viewing area therebetween and a multiple-function drive means for moving said carriage between said first and second positions;

selection means including selector-activating means for retaining a preselected one of said media in said viewing area when said container moves from said second to its first position without completely removing the trailing edge of said preselected one of said media from said container, and

first over-travel means associated with said carriage and said multi-function drive means for permitting said multi-function drive means to experience initial travel in the direction of travel of said carriage between its first and second positions before said carriage begins to move between its first and second positions, and for permitting said multi-function drive means to continue moving after said carriage has been moved between its first and second positions.

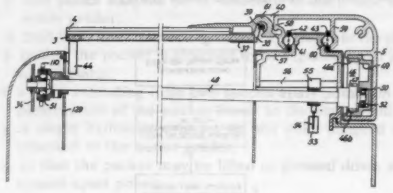
3,993,406
ELECTROPHOTOGRAPHIC COPYING APPARATUS

Karl Gustav Zeuthen, Gentofte, Denmark, assignor to Zeuthen & Aagaard A/S, Glostrup, Denmark

Filed Oct. 7, 1975, Ser. No. 620,346
Claims priority, application Denmark, Oct. 15, 1974, 5399/74
Int. Cl.² G03G 15/28; G03B 27/50, 27/62, 27/10
U.S. Cl. 355—8 **4 Claims**

1. An electorphotographic copying apparatus comprising a housing, a table including a transparent table plate for supporting an original to be copied and arranged for reciporocating linear movement on the top of said housing out of and back to a home position, an illumination station including a light source arranged in said housing below said table for exposure of a photosensitive copy sheet by said original line

by line during said reciprocating movement, a carriage hinged to said table plate along one side thereof and a single longitudinal guide rail arranged stationarily at one side of said housing for guiding the movement of said carriage, and means arranged at said housing for pointwise supporting said table plate at the opposite side relative to the carriage.

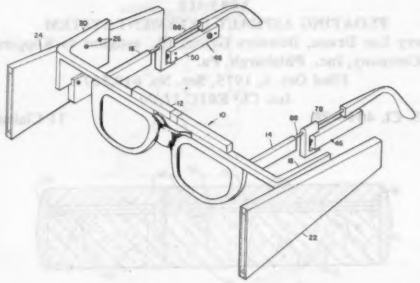


3,993,407

POLYSENSORY MOBILITY AID

Larry S. Moricca, Churubusco, and Ronald H. Stroer, Fort Wayne, both of Ind., assignors to Zipcor, Inc., Fort Wayne, Ind.

Filed Sept. 19, 1975, Ser. No. 615,060
Int. Cl.² G01C 3/00
U.S. Cl. 356—1 15 Claims



1. A polysensory mobility aid comprising first and second signal generating means which produce audio frequency signals, respectively, two electrically operable stimulating devices coupled, respectively, to said first and second signal generating means for activating each of said devices in response to said signals, respectively;

each of said signal generating means including two camera means that generate signals representative of the brightness of optical images projected thereonto, each signal generating means including a first fixed frequency signal generator which provides a first signal fixed frequency and a second variable frequency signal generator which provides a second signal which varies between limits of a predetermined frequency spectrum, each first and second signal generator being coupled to a respective one of said stimulating devices;

each camera means including first and second photosensitive devices disposed to receive radiation from a common object, said first signal generator including first circuit means connecting said first photosensitive device into said first signal generator for selectively activating and deactivating the latter in response to image brightness on said first photosensitive device above and below, respectively, a predetermined level, said second signal generator including second circuit means connecting said second photosensitive device into said second signal generator for varying the frequency of the second signal thereof in response to varying image brightness impinging on said second photosensitive device;

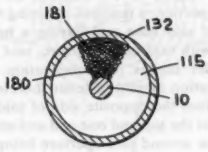
means positioning said two camera means in horizontally spaced relation to have horizontally spaced independent fields of view, whereby oscillatory rotational movement of said camera means about a vertical axis generally between said camera means causes successive imaging onto said two camera means of an object being viewed.

3,993,408

PENCIL COMPRISING A MARKING CORE AND A POROUS RESIN SHEATH

Irving J. Arons, Peabody; Robert Eller, Boston, and Richard E. Merrill, Wakefield, all of Mass., assignors to Hasbro Industries, Inc., Pawtucket, R.I.

Division of Ser. No. 348,664, April 6, 1973, Pat. No. 3,875,088, which is a continuation-in-part of Ser. No. 163,303, July 16, 1971, abandoned. This application Oct. 29, 1974, Ser. No. 518,878
Int. Cl.² B43K 19/14
U.S. Cl. 401—96 4 Claims



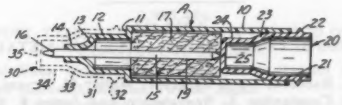
1. A pencil comprising a marking core and a sheath bonded to the core, the sheath comprising an extrusion grade thermoplastic resin binder having a Vicat softening point above about 180° F., a comminuted cellulosic fiber filler, and a substantially water-insoluble metallic soap, the binder/filler ratio being approximately 1.5 to 3.0, the sheath being provided with closed cells having a maximum diameter of approximately 100 microns, the size of the cells decreasing radially outward from the core to provide a substantially smooth outer surface on the sheath.

3,993,409

COLORING PEN ASSEMBLY

Una L. Hart, 1750 Summit Ave., St. Paul, Minn. 55105

Continuation-in-part of Ser. No. 471,437, May 20, 1974, abandoned. This application Sept. 5, 1975, Ser. No. 610,691
Int. Cl.² B43K 5/00
U.S. Cl. 401—199 6 Claims

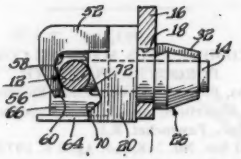


1. A marking pen assembly comprising: a tubular barrel having an open end and a constricted end; a relatively rigid porous nib projecting from and held by said constricted end and extending into the elongated tubular body of the barrel, and impregnated with soluble coloring matter; a cap removably tightly fitting said open end; and a solvent-absorptive, porous, dimensionally stable plug dimensioned and constructed to fit loosely within said body and snugly about the extended nib when forced into said body.

3,993,410
ROD RETAINER

Ernest Harold Lindsay, Jr., Mokena, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill.

Filed Sept. 11, 1975, Ser. No. 612,410
Int. Cl.² F16C *11/00*
U.S. Cl. 403—13 **11 Claims**



1. A one-piece plastic fastener for connecting an elongated actuating rod of a predetermined diameter terminating in a short substantially right angle end portion to an apertured lever member, said fastener including a generally rectangular base member having an aperture at one end thereof for accepting said end portion, a resilient retaining means extending from one side of said base and having a bore co-axial and communicating with said base aperture, said retaining means including shoulder means for cooperation with said lever member for retention of said fastener thereto, an upstanding wall extending from the opposite side of said base forming a receptacle open at the top and one end and encompassing said aperture, the base around said aperture being chamfered and said wall having a tapered inside surface which is substantially a continuation of said chamfer to provide a lead for said rod end portion to the base aperture and into the bore of the retaining means, a substantially rigid retaining arm including a first section extending from the opposite side of said base along one edge thereof in spaced relation to said aperture, a second section of said arm extending cantilever fashion over at least half the width of said base, said second section having upper and under surfaces, said surfaces in at least the free end portion of said second section being sloped toward the plane of said base and said slope terminating at the free end of said second section and the under surface being spaced from said base a distance a least equal to said predetermined diameter, a thin resilient finger extending from the opposite edge of said base in the same direction as the first section of said retaining arm in spaced relation to the free end of said second section of said arm, the distance between said resilient finger and the free end of said retaining arm being less than the predetermined diameter of said rod whereby said finger must be deflected laterally from the opposite side of said base away from said arm to permit said rod to be introduced into retained relation under said second section of said arm, and means for positioning said rod in predetermined relation to the under surface of said arm.

3,993,411
BONDS BETWEEN METAL AND A NON-METALLIC SUBSTRATE

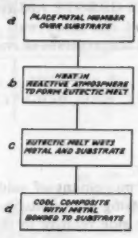
Guy L. Babcock, North Syracuse; Walter M. Bryant, Liverpool; Constantine A. Neugebauer, and James F. Burgess, both of Schenectady, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Continuation of Ser. No. 366,043, June 1, 1973, abandoned, which .s a division of Ser. No. 245,889, April 20, 1972, Pat. No. 3,766,634. This application Feb. 12, 1975, Ser. No. 549,440
Int. Cl.² C04B *37/02*
U.S. Cl. 403—271 **6 Claims**

1. A bonded structure comprising:

a metallic member constituting a metallic substance selected from the group consisting of copper, nickel, cobalt, iron, chromium, copper-nickel, nickel-cobalt, copper-chromium, copper-cobalt, iron-nickel, silver-gold and beryllium-copper;

a non-metallic member selected from the group consisting of alumina, beryllia, and fused silica;

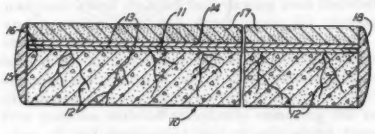


and a bond between said metallic member and said non-metallic member comprising a fused eutectic composition comprising a mixture of said metallic substance and a reactive gas selected from the group consisting of a sulfur-bearing gas and a phosphorus-bearing gas, said mixture being substantially devoid of oxides of said metallic substance.

3,993,412
FLOATING ASPHALT PAVEMENT SYSTEM

Terry Lee Drane, Downers Grove, Ill., assignor to Koppers Company, Inc., Pittsburgh, Pa.

Filed Oct. 6, 1975, Ser. No. 619,567
Int. Cl.² E01C *21/00*
U.S. Cl. 404—28 **11 Claims**

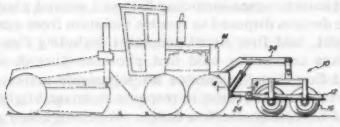


1. An asphalt resurfaced recreational area comprising an existing surface, multiple layers of a free floating flexible material on top of the existing surface, said free floating layers being affixed to the existing surface and each other by a perimeter tacking, and a new asphalt surface on top of the free floating layers.

3,993,413
ROAD PACKER

Ray N. Cox, and Martin A. Parks, both of Star Rte. 1, Box 20, Fluvanna, Tex. 79517

Filed Apr. 25, 1975, Ser. No. 571,589
Int. Cl.² E01C *19/26*
U.S. Cl. 404—128 **6 Claims**



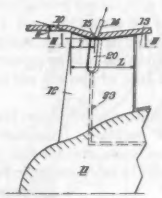
1. In a pneumatic tire packer to the attached behind a motor grader, the packer having

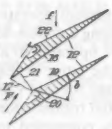
a. a rectangular peripherial packer frame having two shafts connected thereto, each shaft having a plurality of pneumatic tires mounted thereon;
b. THE IMPROVEMENT COMPRISING:
c. two plates adapted to be attached to each side of the motor grader,
d. draft links interconnecting the packer frame to the plates,
e. so that the packer is attached to two spaced-apart points to the plates,
f. a yoke extending from two spaced-apart points on a superstructure of the packer frame to the plates, and
g. a single hydraulic cylinder on the yoke adapted to be attached to the motor grader,
h. so that the packer may be lifted or pressed down at two spaced-apart points.

3,993,414
SUPERSONIC COMPRESSORS

Georges D. Meauze, Paris; Jean-Jacques Thibert, Verrieres-le-Buisson, and Jacky R. Leynaert, Igny, all of France, assignors to Office National d'Etudes et de Recherches Aerospatiales (O.N.E.R.A.), Chatillon-sous-Bagneux, France

Filed Oct. 18, 1974, Ser. No. 516,126
Claims priority, application France, Oct. 23, 1973, 73.37751
Int. Cl.² F04D *21/00*
U.S. Cl. 415—181 **12 Claims**



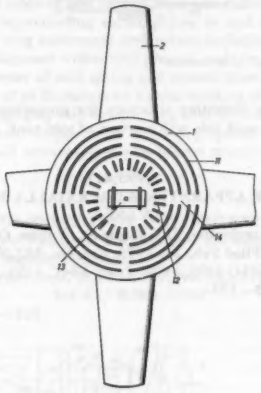


1. In a rotary supersonic compressor comprising a casing having an axis, a rotor mounted for rotation about said axis and having a hub carrying a first set of blades spaced from said axis, regularly distributed about said axis and defining axial passages for a gaseous fluid to be compressed, a second set of blades carried by said casing., spaced from said axis, regularly distributed about said axis and defining axial passages receiving fluid from the passages of said rotor, said rotor being arranged to be driven in operation at a speed sufficient for the gaseous fluid to experience a shock wave transition from supersonic speed to a lesser speed at least in the radially outward portion of the blades of one of said first and second sets, the improvement wherein the suction surface of each blade of the said one set is formed with a zone of change of curvature located to correspond with the position of the shock wave, and each blade is formed with a channel connected to boundary layer aspiration means and opening in the suction surface into said zone, the rear portion of each said channel in the direction of flow being separated from the gas flow bounded by two successive blades, by a rim terminated by an edge limiting the opening of the channel into said suction surface.

3,993,415
FAN WITH FLUID FRICTION CLUTCH

Kurt Hauser, Stuttgart, Germany, assignor to Suddeutsche Kuhlerfabrik, Julius Fr. Behr, Stuttgart, Germany

Filed Dec. 19, 1974, Ser. No. 534,238
Claims priority, application Germany, Jan. 12, 1974, 2401462
Int. Cl.² B63H *1/20*
U.S. Cl. 416—93 R **1 Claim**



1. In a fan having an axis of rotation and a fluid friction clutch, especially for cooling internal combustion engines, wherein the clutch housing of said clutch is connected with the fan or has fan blades attached thereto and wherein a front surface of said clutch housing facing the air intake opening of the fan is provided with arcuate cooling ribs to carry off the slippage heat developed in the clutch, the improvement wherein said arcuate cooling ribs have an arcuate length many times there radial width and are disposed on said front surface of said clutch housing in the form of concentric circles radially displaced from said axis of rotation, said arcuate cooling ribs being interrupted at several points around the circumferences thereof; and including additional unconnected radial cooling ribs disposed within said circles at the center of said front of said clutch housing.

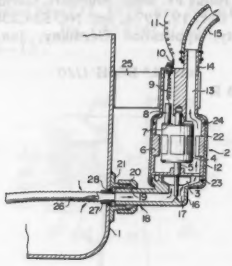
3,993,416
FUEL TANK ASSEMBLY AND A METHOD OF CONSTRUCTING SAME

Shinichi Kato, Toyota, Japan, assignor to Toyota Jidosha Kogyo Kabushiki Kaisha, Toyota, Japan

Filed May 29, 1975, Ser. No. 581,733
Claims priority, application Japan, Jan. 28, 1975, 50-11556
Int. Cl.² F04B *39/02, 39/06*
U.S. Cl. 417—360 **8 Claims**

1. A fuel tank assembly comprising a fuel tank and a centrifugal fuel pump which possesses substantially no drawing ability, said pump being mounted on the outside of said tank by a conduit structure which extends from the lower side wall portion of said tank to support said pump and connects the inlet port of an impeller chamber of said pump to the internal lower space portion of said tank and a tubular filter element mounted to extend from the end of said conduit structure

toward the internal space of said tank, said tubular filter element being provided with a flange element which is incorporated into a mounting structure for mounting said conduit structure to said side wall portion of said tank.

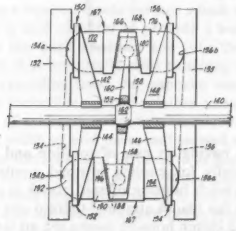


3,993,417

ROTARY APPARATUS WITH AXIALLY MOVABLE VANES

Walter J. Harrington, 723 Maple St., Yukon, Okla. 73099

Filed Feb. 24, 1975, Ser. No. 552,364
Int. Cl.² F01C *1/00*; F03C *3/00*; F04C *1/00*; F01C *19/00*
U.S. Cl. 418—137 **5 Claims**



1. A positive displacement, swept volume rotary apparatus comprising:

a housing having two substantially parallel side wall means, each of said side wall means having an annular recess therein of varying depth extending symetrically around a central axis through the housing, said recesses varying sinusoidally in depth and in width over their entire extent;

a rotor rotatably supported in said housing for rotation about said central axis;

a plurality of spaced vane means slidably mounted in said rotor and each reciprocably slidable relative to said rotor in a direction parallel to the axis of rotation of the rotor, each of said vane means being of equal length as measured between the opposed ends thereof and along lines extending parallel to the rotational axis of the rotor, and each of said vane means comprising:

a first pair of abutting, relatively movable vanes projecting from said rotor, and each having an outer edge at one of said opposed ends of the respective vane means with said outer edges sealingly engaging one of said recesses;

a second pair of abutting, relatively movable vanes projecting from said rotor in the opposite direction from the vanes in said first pair, and each having an outer edge at the other of said opposed ends of the respective vane means, with the outer edges of the vanes in said second pair sealingly engaging the other of said recesses; and

wedge means positioned between said first and second pairs of vanes and movable relative thereto by centrifugal force developed during the rotation of said rotor to urge said vanes individually and independently toward the respective recesses; and

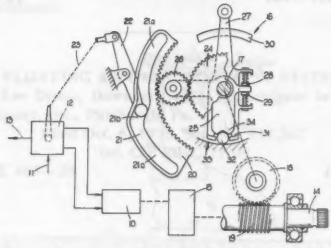
sealing means on the rotor between adjacent pairs of said vane means, and cooperating with said vane means to partition each of said recesses into a plurality of sealed chambers, each of said sealing means comprising a plate positioned between and contacting adjacent movable vanes in each of said first and second pairs of movable vanes and cooperating with the vanes with which said plate is in contact to sealingly isolate and close portions of said recesses.

3,993,418

FLUID-PRESSURE OPERATED ACTUATOR WITH FOLLOW-UP TRANSMISSION

John Richard Simmons, Wolverhamton, England, assignor to Lucas Industries Limited, Birmingham, England

Filed July 21, 1975, Ser. No. 597,593
Claims priority, application United Kingdom, July 30, 1974, 33515/74
Int. Cl.² F15B *9/10*; F01C *1/18*, *21/00*
U.S. Cl. 418—206 **10 Claims**



1. A fluid-pressure operated actuator with follow-up transmission, including a double-acting pressure-operated actuator device, a valve operable to apply a fluid pressure to said device to drive the latter in respective opposite directions, and a control linkage for said valve, said control linkage comprising a differential transmission arrangement having a first element drivingly connected to said valve, a second element drivingly connected to said actuator device and a third element drivingly cooperating with said first and second elements, the velocity of any one of said elements being dependent on the relative velocities of the other two elements, an input member, means for resiliently coupling said input member to said third element, means restraining free movement of said input member and a braking means, operable only when arrest of said first element causes said third element to apply a driving force to said input member, for preventing movement of said third element.

3,993,419

APPARATUS FOR TENSIONING REINFORCEMENT IN A CONCRETE POLE MOLD

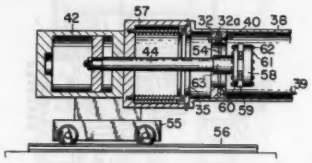
Takemitsu Mori, Hachioji; Toshio Tsunoda, Fujisawa; Shinzo Hasegawa, Kanagawa, and Masao Tanaka, Kamakura, all of Japan, assignors to Nippon Concrete Industries Co. Ltd., Tokyo, Japan

Filed Dec. 30, 1974, Ser. No. 537,368
Int. Cl.² B28B *21/60*
U.S. Cl. 425—111 **7 Claims**

1. An apparatus for tensioning reinforcements in the process of manufacturing concrete poles and the like comprising:

a tension plate, of a circular ring shape, fixed to an end plate which is, in turn, adapted to be fixed to reinforcements disposed interiorly of a circular mold in a freely slidable manner,

the inner surface of the tension plate having protuberances which are cooperable with similar means of a piston rod driven by means of a jack, whereby said tension plate is engageable with and removable from said piston rod which is insertable and removable from said mold, the outer periphery of the tension plate also being provided with protuberances the thickness of which is less than that of the tension plate, said inner and outer protuberances being disposed at equal intervals about said tension plate, and



a rotatable set ring of a circular ring shape spring biased, by means of said jack, into contact with a flange part formed at the end of the mold,

the inner surface of the set ring being provided with protuberances, for contacting the outer protuberances of the tension plate, and concave parts through which said outer protuberances of said tension plate can be disposed so as to permit the set ring to pass by and around said tension plate,

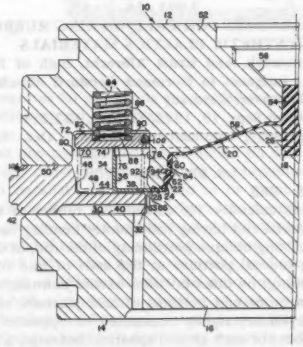
whereby said reinforcements may be tensioned and retained in said tensioned condition when said outer protuberances of said tension plate are aligned with and engage said inner protuberances of said set ring upon said set ring being rotated.

3,993,420

RETAINER ASSEMBLY FOR MOLD PLATE

Norman C. Haas, Wheaton, and Keith W. Christiansen, Fox River Grove, both of Ill., assignors to Chicago Rawhide Manufacturing Company, Elgin, Ill.

Filed June 16, 1975, Ser. No. 587,378
Int. Cl.² B29F *1/00*; B29D *3/00*
U.S. Cl. 425—127 **7 Claims**



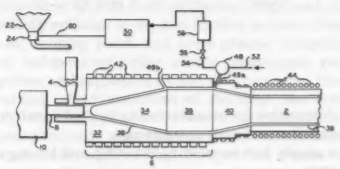
1. An apparatus for making composite, insert-molded articles having a resilient portion bonded to a relatively rigid insert, said apparatus including first and second mold parts movable relative to each other along a given axis, with each of said parts having portions at least partially defining therebetween the cavity in which said resilient portion is to be molded, and further including portions defining cavity inlet means permitting flow of curable, article-forming material into said cavity, means on said first mold part for engaging one surface of said insert, means on said second mold part for engaging another surface portion of said insert, an annular, stripper ring-receiving recess in said second mold part, said recess being defined by at least one axially extending sidewall and a radially extending end wall, an annular stripper ring disposed within said recess in said second mold part and being mounted for axial movement between extended and retracted positions within said recess, a stripper ring stop rib disposed on said axial sidewall and spaced from said radial end wall, an annular, spring-receiving radial groove in said stripper ring, and stripper ring movement stop means including an annular coil spring disposed within said groove, engaging said groove on one diameter of said spring and spaced from said sidewall on the other of its diameters by a close working clearance, said coil spring engaging said stripper ring stop rib in said extended position of said stripper ring and being spaced axially from said rib in said retracted position of said stripper ring.

3,993,421

CONTROL SYSTEM FOR DYNAMIC EXTRUDER

James G. Adair, Pasadena, Tex., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Sept. 5, 1974, Ser. No. 503,319
Int. Cl.² B29D *23/04*
U.S. Cl. 425—145 **4 Claims**



1. A dynamic extrusion apparatus comprising: a housing and a die means having a mandrel therein and defining first, second, third, and fourth zones;

a. in said first zone a plastic melt is formed into a desired cross-sectional shape and maintained in said shape until solidified;

b. a second zone in operable communication with said first zone wherein said plastic melt is plasticated;

c. said third zone in operable communication with said second zone wherein a plastic material is heated to form said plastic melt;

d. said fourth zone in operable communication with said third zone wherein said plastic material is introduced to said apparatus;

e. heating means in association with said third zone for heating said plastic material to a melted state;

f. means providing a smoothly decreasing temperature gradient along said first zone;

g. a reciprocating means communicating with said fourth zone to force said plastic material through said third and second zones into said first zone;

h. feeding means for feeding said plastic material to said fourth zone;

i. signal means in operable communication with said second zone to measure pressure of plastic melt in said second zone and provide a signal P_M;

j. signal receiving and control means in communication with said signal means adapted to receive said signal P_M and to compare said signal to a set point P_H, the value of said set point P_H being lower than the design stress of said first zone, said means being in further communication with

said feeding means and adapted to stop said feeding means when said signal P_M is equal to or greater than set point P_H, thereby stopping the flow of said plastic material to said fourth zone.

3,993,422

MACHINE FOR THE MANUFACTURE OF TWISTED DOUGH ARTICLES

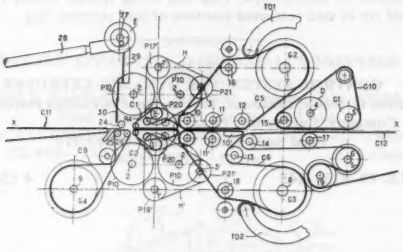
Jacques Riviere, Reims, and Raymond Simon, Soisy-sur-Seine, both of France, assignors to Lu, Brun & Associes S.A., Athis-Mons, France

Division of Ser. No. 338,743, March 7, 1973, Pat. No. 3,889,012. This application Mar. 31, 1975, Ser. No. 563,574

Claims priority, application France, Mar. 10, 1972, 72.08519

Int. Cl.² A21C *11/10*

U.S. Cl. 425—304 **10 Claims**



1. A machine for manufacturing twisted bars from a strip of a pastry-like material, comprising

a. a supply belt supporting the striip and having a discharge end,

b. a discharge belt supporting and removing the twisted bars, the discharge belt being coplanar with the supply belt and spaced therefrom,

c. means for cutting the strip into successive, transversely extending ribbons, the cutting means being positioned adjacent the discharge end of the supply belt,

d. pairs of facing upper and lower conveyor belts defining therebetween a bed for conveying the successive ribbons from the discharge end of the supply belt to the discharge belt, the bed being coplanar with the supply and discharge belts and being positioned therebetween,

1. a clear longitudinal passage for the ribbons being defined between the facing conveyor belts and

2. the facing belts cooperating to entrain the ribbons from the supply to the discharge while gripping them at transversely spaced positions in the passage against displacement,

e. a twisting device positioned in the longitudinal passage between the transversely spaced positions, the twisting device comprising

1. facing upper and lower belts, the upper and lower twisting device belts defining a clear longitudinal passage for alignment with the clear longitudinal passage defined between the conveyor belts and cooperating to grip the ribbons against displacement, and

2. means for turning the cooperating twisting device belts about a transverse axis extending in the plane of the bed while a respective one of the ribbons is gripped therebetween to twist an adjacent portion of the gripped ribbon, and

f. means for flattening the twisted ribbon portion arranged between the twisting device and the discharge belt.

3,993,423

MULTILEVEL VULCANIZING PRESS

Karl-Friedrich Stettes, Dabringhausen, and Hans-Joachim Körber, Witzhelden, both of Germany, assignors to Goetzewerke Friedrich Goetze A.G., Burscheid, Germany

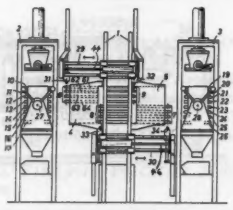
Filed Mar. 5, 1975, Ser. No. 555,456

Claims priority, application Germany, Mar. 5, 1974, 2410384

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 30, 1976

Int. Cl.² B29H *5/20*; B29J *5/00*; B29H *7/00*; B29C *7/00, 17/00*

U.S. Cl. 425—339 **5 Claims**



1. Multilevel vulcanizing press comprising:

a. a press housing containing at least two press levels, with each press level capable of receiving a molding tool which can be opened and closed within the press housing, with each molding tool being comprised of a plurality of molding plates and which can be opened at a right angle to the mold parting plane;

b. a first servicing station on one side of said housing for accommodating a molding tool from each level of the press housing;

c. a second servicing station on another side of said housing for accommodating a molding tool from each level of the press housing;

d. a first holding station between the press housing and the first servicing station for receiving a molding tool from each level of the press housing;

e. a second holding station between the press housing and the second servicing station for receiving a molding tool from each level of the press housing; and

f. guide means for guiding each molding tool from the press housing into one of the holding stations and into one of the servicing stations and vice versa.

3,993,424

ROLL CALENDERS FOR CALENDERING RUBBER OR SYNTHETIC PLASTICS MATERIALS

Werner Pawelczyk, and Ernst Albrecht, both of Misburg, Germany, assignors to Hermann Berstorff Maschinenbau GmbH, Hannover, Germany

Filed Sept. 10, 1975, Ser. No. 612,211

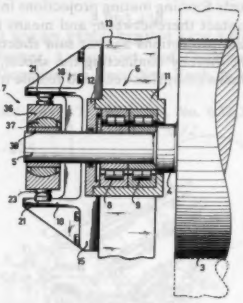
Claims priority, application Germany, Oct. 1, 1974, 2446771

Int. Cl.² B29C *15/00*

U.S. Cl. 425—363 **1 Claim**

1. In a roll calender, for calendering rubber or synthetic plastics material and having roll counter bending means and means permitting oblique positioning of the roll, in combination a roll; journal portions at the ends of said roll; main support bearings on inner portions of said journals; spherical bearings on outer end portions of said journals; respective hydraulic cylinders rigidly connected to opposite sides of outer members of each of said spherical bearings; a piston in each of said hydraulic cylinders; a vertical piston rod for each said piston with said piston secured to said piston rod intermediate the ends of said piston rod, such that counter bending of said roll can be effected by pressurisation of said hydraulic

cylinders selectively above or below said pistons; and fixed support members with grooves therein, ends of said piston rods being engaged in respective ones of said grooves such that said ends are movable horizontally in said grooves in



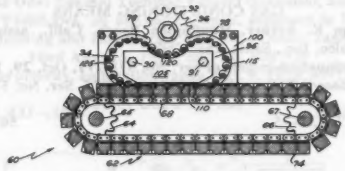
directions substantially perpendicular to the axis of said roll to allow said axis of said roll to be moved into oblique relationship with the axis of a co-operating roll located above or below said roll.

3,993,425

APPARATUS FOR FORMING DIAGONALLY CORRUGATED PAPERBOARD

Richard G. Dunn, Greensboro, N.C.; Melvin H. Sidebotham, Jr., and Gordon L. Sidebotham, both of Winchester, Mass., assignors to The Real-Reel Corporation, East Providence, R.I.

Filed Mar. 20, 1975, Ser. No. 560,186
Int. Cl.² B29C *15/00;* **B31D** *1/00*
U.S. Cl. 425—370 **10 Claims**



1. Apparatus for producing corrugated sheet from a web of deformable material comprising

a frame,

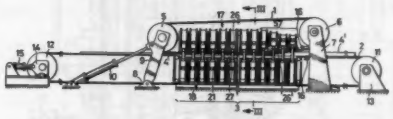
at least one corrugating unit mounted on said frame comprising conveyor means having a continuous loop belt with parallel grooves formed in its outer surface, and means to force a web of deformable material down into the grooves of said belt as the web of deformable material is passed through the apparatus, closed loop path means at each side of the conveyor means, said means to force the web of deformable material down into the grooves of said belt comprising a plurality of rods independent of each other that floatingly extend across the width of said continuous loop belt and whose opposite ends are floatingly carried around said closed loop path means during a major portion of their travel and a cam to force said rods into said sheet during a portion only of their travel while performing the corrugating operation.

3,993,426

CONTINUOUS PRESS HAVING IMPROVED ANTI-FRICTION ROLLERS

Karl-Heinz Ahrweiler, Krefeld; Kurt Quoos, Krefeld; Eduard Küsters, Krefeld-Forstwald, and Valentin Appenzeller, Kempen, Niederrhein, all of Germany, assignors to Eduard Kusters, Krefeld-Forstwald, Germany

Continuation-in-part of Ser. No. 308,556, Nov. 21, 1972, Pat. No. 3,851,685. This application Oct. 31, 1974, Ser. No. 519,626
Claims priority, application Germany, Nov. 8, 1973, 2355797; Nov. 22, 1971, 2157746; Oct. 5, 1972, 2228760
Int. Cl.² B27D *3/04;* **B29D** *7/14*
U.S. Cl. 425—371 **10 Claims**



1. In an apparatus for exerting a flat pressure on a lengthwise section of an advancing strip such as a continuous press for the continuous production of panel materials being produced under pressure in which the strip is conducted between endless forming bands extending across the width of the strip and circulating in the direction in which the strip advances with pressure transmitted to the endless forming bands from the press platens applying pressure to said forming bands with means between said forming bands and press platens for transmitting pressure in an anti-friction manner, improved means for transmitting pressure in an anti-friction manner disposed between said forming bands and press platens comprising a plurality of independent roller chains transversely packed closely together and supported so that they can move forward in the direction of advancement of the strip and forming bands, each of said independent chains being individually free to travel independently with respect to the others and said forming bands, with each of said independent chains being formed of a plurality of linked units, each unit including at least two rollers supported on a roller pin with flat links lying in a plane perpendicular to the roller pin linking the units, the outside rollers of each unit being cantilevered on the roller pin, all rollers in a row in the direction of travel being of equal diameter and having their outer end faces situated in a plane which forms the outer limiting surface for the roller chain.

3,993,427

MOVABLE PREFORM LOCATOR AND BLOW AIR VALVE APPARATUS FOR A BLOW MOLDING MACHINE

Ivan L. Kauffman, Commerce Township, Oakland County, and Barry C. Owen, Southfield, both of Mich., assignors to Monsanto Company, St. Louis, Mo.

Filed Oct. 11, 1974, Ser. No. 513,972
Int. Cl.³ B29C *17/02, 17/07*
U.S. Cl. 425—387 B **17 Claims**

1. In a blow molding machine having a mold assembly with a locating shoulder therein and a stretch pin assembly mounted in operative relation with said mold assembly, the combination comprising:

a. a tubular valve body in said stretch pin assembly;

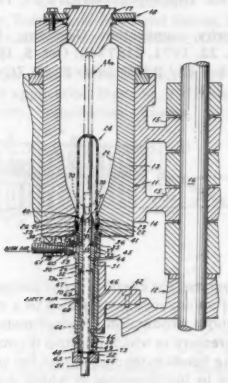
b. a longitudinally movable blow air nozzle means slidably mounted in said valve body for carrying a preform and locating and sealing a preform against said shoulder in the mold assembly;

c. a blow molding stretch pin movably mounted longitudinally through said blow air nozzle means for stretching a preform mounted on said blow air nozzle means;

d. a blow air passage means operatively formed through said tubular valve body and blow air nozzle means for admitting blow air under pressure into a preform on said blow

air nozzle means in said mold assembly for blowing the preform into a finished article;

e. means cooperating with said blow air nozzle means for longitudinally moving said blow air nozzle means in said tubular valve body in one direction into an initial position at which a preform is loaded onto the blow air nozzle means; and



f. means operatively connected to said blow air nozzle means for longitudinally moving said blow air nozzle means in said tubular valve body in the opposite direction a first distance to locate and seal a preform carried thereon against said shoulder in the mold assembly, and for longitudinally moving said blow air nozzle means a second distance in said opposite direction beyond said first distance for shutting off said blow air passage means in the absence of a preform on the blow air nozzle means during operation of the blow modling machine.

3,993,428

APPARATUS FOR FASTENING A CORRUGATED SHEET TO A FLAT SHEET

Peter Gumm, Frankfurt am Main; Karl-Heinz Krussig, Hattersheim; Jürg Lohmann, Dortmund, and Josef Zimmermann, Niederhofheim, Taunus, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Division of Ser. No. 245,347, April 19, 1972, Pat. No. 3,798,299. This application Nov. 1, 1973, Ser. No. 411,765

Claims priority, application Germany, Apr. 21, 1971, 2119321

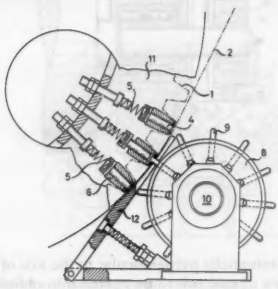
Disclosure was also published under second Trial Voluntary Protest Program on Feb. 24, 1976

Int. Cl.² B29C 27/12, 27/14

U.S. Cl. 425—521 **11 Claims**

1. A device for use in manufacturing a structure consisting of interconnected corrugated and flat sheets of thermoplastic film, wherein said corrugated sheet is secured to the flat sheet along the corrugation crests on one side of the corrugated sheet; said device comprising first and second spaced mold elements positioned to receive the corrugated and flat sheets therebetween; said first mold element having a plurality of recessed female mold members adapted to be received between the corrugations of the corrugated sheet and said second mold element having a plurality of elongated male plugs projecting therefrom and means for inserting the plugs into the recesses of the female mold elements to form mating projections in the flat and corrugated sheets and for removing the plugs from said recesses and projections; said female mold elements including punch means movably mounted in the recesses thereof and means for sequentially urging said punch means against said projections upon removal of said plugs therefrom and for compressing the projections against said sheets thereby to form undercuts interconnecting the sheets.

10. A device for the manufacture of a structure consisting of operably interconnected corrugated and flat sheets formed of thermoplastic film material positioned in superimposed relation to each other with portions of the corrugated sheets in contact with the flat sheet, said device comprising means for simultaneously forming mating projections in said sheets in the areas of contact therebetween, and means for thereafter compressing said projections against said sheets to form undercuts therein, thereby connecting the sheets; and wherein said forming means comprises recessed female mold members



adapted to be received between the corrugations of said corrugated sheets, an opposed male member, and means for inserting the male member into the recesses of the female mold members through said sheets at the areas of contact therebetween to form mating projections in the flat and corrugated sheets and for removing the male members therefrom; said female mold members including punch means movably mounted in the recesses thereof and means for sequentially urging said punch means against said projections upon removal of said male member therefrom and for compressing the projections against said sheets thereby to form undercuts interconnecting the sheets.

3,993,429

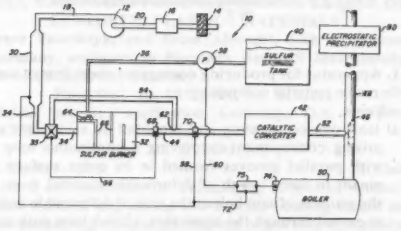
GAS CONDITIONING MEANS

William E. Archer, Huntington Beach, Calif., assignor to Wahlco, Inc., Santa Ana, Calif.

Continuation-in-part of Ser. No. 518,271, Oct. 29, 1974, abandoned. This application May 7, 1975, Ser. No. 575,158

Int. Cl.² F23D 13/20

U.S. Cl. 431—5 **50 Claims**



1. A method of preconditioning a boiler flue gas mixture containing fly ash for the efficient removal of the fly ash by electrostatic precipitation comprising the steps of: directing at least a portion of a flow of air into a sulfur burner; directing sulfur into said sulfur burner; combusting said sulfur within said sulfur burner to create a fluid mixture including the combustion products of said sulfur; detecting the temperature of said fluid mixture exiting from said sulfur burner; selectively

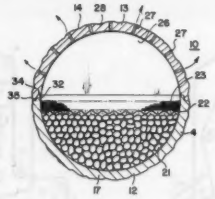
varying the quantity of said portion of said directed flow of air in response to said detecting; passing said fluid mixture through a catalytic converter to produce a conditioning mixture; and combining said conditioning mixture with said flue gas mixture prior to passing said flue gas mixture into an electrostatic precipitator.

3,993,430

LIQUID FUEL FIREPLACE LOG

Richard O. Forker, Logansport, Ind., assignor to The Raymond Lee Organization, Inc., New York, N.Y., a part interest

Filed Nov. 17, 1975, Ser. No. 632,389
Int. Cl.² F23Q 2/32
U.S. Cl. 431—125 2 Claims



1. A ceramic log formed of two assembled sections of ceramic material each of which section is formed with a hollow interior, with the ceramic log shaped on its exterior to resemble a natural wood log, with

a first section, which serves as the bottom of the assembled log in use, fitted with particles of non-combustible matter, and

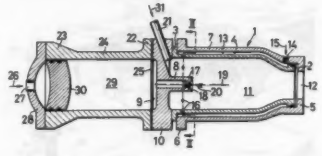
the second section, which serves as the top of the assembled log in use formed with vent holes in the walls of the said section leading from the interior chamber.

3,993,431

APPARATUS FOR GENERATING HIGH-PRESSURE GAS

Noriyuki Oda; Takashi Yoshida; Takeshi Nakanishi, and Kensuke Yoshikawa, all of Osaka, Japan, assignors to Hitachi Shipbuilding and Engineering Co., Ltd., Osaka, Japan

Filed Aug. 15, 1975, Ser. No. 604,976
Claims priority, application Japan, Oct. 9, 1974, 49-116564
Int. Cl.² F23L 7/00
U.S. Cl. 431—190 7 Claims



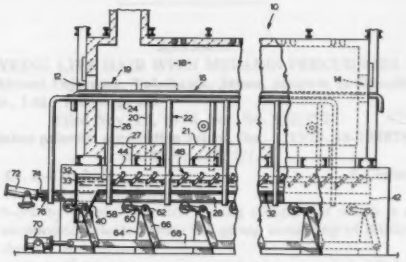
1. An apparatus for generating a high pressure gas comprising a gas generator body including a combustion chamber and a water jacket surrounding the combustion chamber, a metal fuel injecting nozzle disposed in the center of one end of the combustion chamber, the metal fuel injecting nozzle projecting from a closure plate of the gas generator body into the combustion chamber and having a plurality of orifices formed in its front end directed obliquely with respect to the center line extension of the nozzle, and water swirling and injecting means for forcing out water from the jacket in the form of a swirling stream around an injected metal fuel.

3,993,432

CLEANING DEVICE FOR WALKING BEAM FURNACE

Bernard John Koerssen, Rexdale, Canada, assignor to Lee Wilson Engineering of Canada, Downsview, Canada

Filed Dec. 15, 1975, Ser. No. 640,413
Int. Cl.² F27D 15/00
U.S. Cl. 432—67 5 Claims



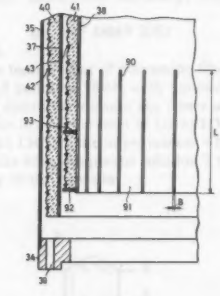
1. In a furnace having a walking beam movable upwardly, forwardly, downwardly and rearwardly in sequence; a heat seal comprising at least one water trough and a pair of parallel skirts having the lower edge portions thereof submerged in the trough; a plurality of paddles mounted in a row on each skirt and depending therefrom into the trough whereby the bottom of the trough is cleaned in the upward and forward movement of the walking beam, means mounting each of said paddles pivotally on the skirt for free upward and downward movement relative to the skirt, and stop means mounted on the skirt limiting the paddle in said downward movement.

3,993,433

CYLINDRICAL ELONGATED FURNACE FOR TREATING MATERIAL AT HIGH TEMPERATURE IN A GASEOUS ATMOSPHERE UNDER HIGH PRESSURE

Sven-Erik Isaksson, Robertsfors, and Bo Christer Jakobsson, Vasteras, both of Sweden, assignors to Allmanna Svenska Elektriska Aktiebolaget, Vasteras, Sweden

Filed Aug. 21, 1975, Ser. No. 606,592
Claims priority, application Sweden, May 27, 1975, 7506009
Int. Cl.² F27D 1/00; F27B 5/04
U.S. Cl. 432—247 7 Claims



1. Cylindrical elongated furnace for treating materials at high temperature in a gaseous atmosphere under high pressure, comprising a vertical cylindrical pressure chamber capable of confining a gas under high pressure, a furnace space, a cylindrical heater around the furnace space, an insulating sheath surrounding the furnace space and the heater, which is formed of a number of metal tubes and insulation applied

between the tubes, and an insulating lid and an insulating bottom at the ends of the insulating sheath, the insulating sheath comprising a metal tube suspended from a supporting member at the upper part of the insulating sheath and provided at its lower part with a number of slots running substantially vertically.

3,993,434

PROCESS AND DEVICE FOR THE FIXATION OF PRINTS WITH REACTIVE DYESTUFFS

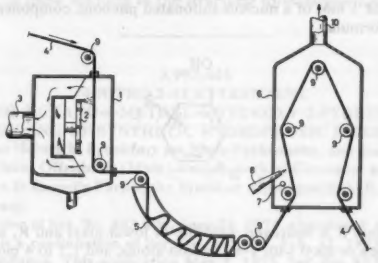
Walter Birke, Frankfurt am Main; Erich Feess, Lorsbach, Taunus; Hans-Ulrich von der Eltz, Frankfurt am Main; Kurt Roth, Hofheim, Taunus, and Franz Schon, Frankfurt am Main, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

Filed Oct. 11, 1973, Ser. No. 405,425

Claims priority, application Germany, Oct. 14, 1972, 2250504

Int. Cl.² D06P *5/00*

U.S. Cl. 8—1 A 9 Claims



1. A process for fixing a reactive dyestuff printed on textile material containing cellulose fibers, which comprises applying to printed and dried textile material an aqueous alkaline bath containing an inflammable organic liquid, passing the textile material through an air atmosphere, igniting and burning the organic liquid from the textile material, thereby heating and fixing the dyestuff.

3,993,435

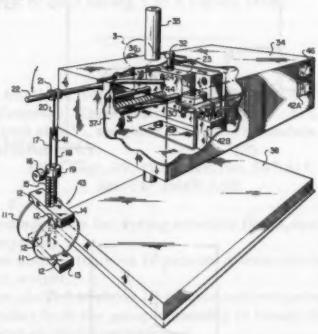
GRADIENT DYEING OF LENSES

Clayton Paul Korver, Dallas, Tex., assignor to Semi-Tech, Inc., Dallas, Tex.

Filed Feb. 23, 1976, Ser. No. 660,820

Int. Cl.² D06P *3/00*

U.S. Cl. 8—4 2 Claims



2. The process for gradient coloring a lens, such as a lens for eyeglasses comprising the steps of,

alternately immersing and withdrawing said lens vertically into and out of a lens coloring liquid to progressively lesser depths on each successive immersion, and simultaneously maintaining chemical uniformity and maximizing surface level stability of the coloring liquid by continuous lens and lens carrier entry and exit motion from the liquid for minimum turbulence eddy circulation.

3,993,436

DYEING LIVE HAIR WITH MELANIN PRECURSORS

Yoshimori Fujinuma, Yokohama, Japan, assignor to Shiseido Co., Ltd., Tokyo, Japan

Filed Nov. 13, 1974, Ser. No. 523,272

Claims priority, application Japan, Dec. 1, 1973, 48-135874

Int. Cl.² A61K *7/13*

U.S. Cl. 8—10.2 5 Claims

1. A hair dye comprising

0.5–3% by weight of a first dyeing component which is a compound selected from the group consisting of dithiothreitol and dithioerythritol;

a second dyeing component which comprises 0.4–8% by weight of (a) a compound selected from the group consisting of tyrosine, DL-β-(3,4-dihydroxyphenyl)alanine, and the methyl ester of the latter compound, and (b) 0.3–3% by weight of a compound selected from the group consisting of 5-hydroxyindole, methyl-5,6-dihydroxyindole-2-carboxylate, tyramine, dopamine, 6-hydroxydopamine and pyrocatechol;

1–10% by weight of a third dyeing component which is a persulfate selected from the group consisting of ammonium persulfate and potassium persulfate, and; said hair dye further comprising 0.1–5% by weight of tyrosinase in combination with said second or third dyeing component; and said first, second and third components being in combination with an aqueous carrier.

3,993,437

PROCESS FOR THE DYEING OF POLYAMIDE FIBERS WITH SULPHUR DYESTUFFS

Heinz Dickmanns, Frankfurt am Main; Karl-Heinz Keil, Offenbach, Main, and Joachim Ribka, Offenbach, Main-Bürgel, all of Germany, assignors to Cassella Farbwerke Mainkur Aktiengesellschaft, Germany

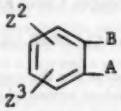
Filed Oct. 29, 1974, Ser. No. 518,262

Claims priority, application Germany, Nov. 13, 1973, 2356548

Int. Cl.² D06P *3/82*

U.S. Cl. 8—21 B 18 Claims

1. In the single bath dyeing of polyamide fibers and blends of polyamide and cellulose fibers with aqueous solutions of reduced sulphur dyestuffs wherein the fibers are dyed in an aqueous dye liquor in a liquor ratio of 1:5 to 1:30 at a temperature of from 60 to 130° C., the improvement which comprises adding to each liter of said aqueous solution 2 to 20 grams of a dye accelerator of the formula

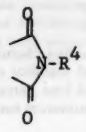


wherein:

A taken separately is hydrogen, halogen, hydroxy or alkoxy or alkyl having 1 to 4 carbon atoms;

B taken separately is —COOR¹ or —Y—Z¹—M or

A and B taken together are of the formula



Y is a direct bond, —O—, —S— or —CO—;

Z^1 is alkylene having 1 to 4 carbon atoms or alkenylene having 2 to 4 carbon atoms;

M is $-COOR^2$ or

Z^2 is hydrogen, halogen, hydroxy or alkyl or alkoxy having 1 to 4 carbon atoms;

Z^3 is hydrogen, halogen, hydroxy, alkyl or alkoxy having 1 to 4 carbon atoms or when B is $-COOR^1$, Z^3 may be $-COOR^1$;

R^1 and R^2 are the same or different and are alkyl having 1 to 6 carbon atoms; alkenyl having 2 to 6 carbon atoms; one of said alkyl or alkenyl radicals substituted by alkoxyalkoxy having 2 to 8 carbon atoms, hydroxy, alkoxy having 1 to 4 carbon atoms or halogen; phenyl; benzyl; phenethyl; phenoxyethyl or phenyl, benzyl, phenethyl or phenoxyethyl having their phenyl nuclei substituted by halogen, hydroxy or alkoxy or alkyl having 1 to 4 carbon atoms;

R^3 is alkyl having 1 to 8 carbon atoms and

R^4 is hydrogen, alkyl having 1 to 8 carbon atoms, phenyl, alkenyl having 2 to 4 carbon atoms or haloalkyl, dihaloalkyl, cyanoalkyl, hydroxyalkyl, alkanoyloxyalkyl, alkoxyalkyl or phenylalkyl, each alkyl moiety having 1 to 3 carbon atoms.

3,993,438

PROCESS FOR COLORING AROMATIC POLYESTER-CELLULOSE UNIONS WITH A REACTIVE DYESTUFF AND A DISPERSE DYESTUFF CONTAINING AT LEAST TWO CARBOXYLIC ACID ESTER GROUPS

Brian Ribbons Fishwick; Violet Boyd, and Brian Glover, all of Manchester, England, assignors to Imperial Chemical Industries Limited, London, England

Filed Apr. 3, 1975, Ser. No. 564,899

Claims priority, application United Kingdom, Apr. 3, 1974, 14783/74

Int. Cl.² D06P *3/82*

U.S. Cl. 8—21 C **8 Claims**

1. An improved process for the continuous coloration of aromatic polyester/cellulose unions which comprises continuously applying to the said unions a reactive dyestuff and a disperse dyestuff which is free from sulphonic acid and carboxylic acid groups and which contains at least two carboxylic acid ester groups, fixing the dyestuffs on the union, and thereafter subjecting the colored union to a treatment in an aqueous alkaline bath at a pH above 8.0 and at a temperature between 50° and 85° C.

3,993,439

DISPERSING AND STABILIZING AGENTS FOR DYESTUFFS

Reinhold Deubel, Altenhain, Taunus; Helmut Diery, Kelkheim, Taunus, both of Germany; Wolfgang Klinner, Sao Paolo, Brazil; Karl-Hermann List, Frankfurt am Main, and Heinz Uhrig, Steinbach, Taunus, both of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

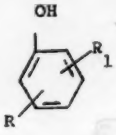
Continuation of Ser. No. 159,065, July 1, 1971. This application Oct. 26, 1973, Ser. No. 409,781

Claims priority, application Germany, July 3, 1970, 2032926

Int. Cl.² D06P *1/16, 1/22, 1/56*

U.S. Cl. 8—34 **1 Claim**

1. A dyestuff dispersion consisting essentially of: (a) one part by weight of a disperse- or vat-dyestuff; and (b) 0.2 to 3 parts by weight of a dispersing agent formed by cocondensation of 1 mol of a nucleus sulfonated phenolic component of the formula



wherein R is hydrogen, chlorine or lower alkyl and R_1 is hydrogen or alkyl with 1–12 carbon atoms, and 1.1 to 4 mols of formaldehyde.

3,993,440

COLORATION WITH AZO CARBOXY PYRAZOLONE

Denis Robert Annesley Ridyard, Manchester, England, assignor to Imperial Chemical Industries Limited, London, England

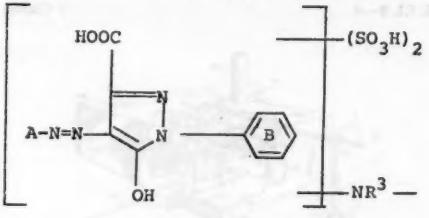
Filed Jan. 28, 1974, Ser. No. 437,390

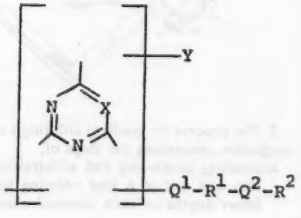
Claims priority, application United Kingdom, Jan. 30, 1972, 4582/72

Int. Cl.² D06P *1/39, 1/382, 1/18*

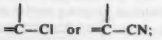
U.S. Cl. 8—41 B **1 Claim**

1. A process for the coloration of polyamide textile materials which comprises treating a polyamide textile material with an aqueous solution of an azo dye of the formula





wherein A represents the residue of a diazo component of the benzene or naphthalene series; X represents =N—,



Y represents chlorine or bromine; Q^1 represents —O—; Q^2 represents a direct link; R^1 represents a phenylene radical; R^2 represents an alkyl radical containing 4 to 7 carbon atoms; R^3 represents hydrogen or lower alkyl and ring B may carry one or more substituents selected from the group consisting of sulpho, chlorine, bromine, hydroxy, alkyl, alkoxy and —NH-COR^5 wherein R^5 is alkyl, aryl, alkoxy, aryloxy, alkylamino, arylamino or amino, any said sulpho substituent being inclusive of those set forth in the structural formula given above.

3,993,441

4-NITRO,2-ALKYLBENZENE AZO-3-CYANO-4-METHYL-6-HYDROXY-2-PYRIDONE DYEING OF SYNTHETIC HYDROPHOBIC FIBERS

Ernst Heinrich, Frankfurt am Main-Fechenheim, and Joachim Ribka, Offenbach (Main)-Burgel, both of Germany, assignors to Cassella Farbwerke Mainkur Aktiengesellschaft, Germany

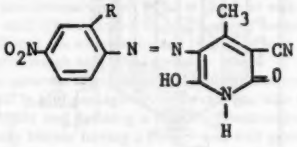
Division of Ser. No. 483,006, June 25, 1974, abandoned, which is a continuation of Ser. No. 331,477, Feb. 12, 1973, abandoned. This application May 1, 1975, Ser. No. 573,768

Claims priority, application Germany, Feb. 18, 1972, 2207661

Int. Cl.² D06P *3/42, 3/52*

U.S. Cl. 8—41 C **3 Claims**

1. In the process for dyeing and printing synthetic hydrophobic fibers with a monoazo dyestuff, the improvement wherein said monoazo dyestuff is of the formula



wherein R is alkyl having 1 to 6 carbon atoms.

3,993,442

ANIONIC DYEING OF NOVOLOID FIBERS

James Economy, Eggertsville, and George Y. Lei, Williamsville, both of N.Y., assignors to The Carborundum Company, Niagara Falls, N.Y.

Filed Sept. 19, 1974, Ser. No. 507,315

Int. Cl.² D06P *3/58*

U.S. Cl. 8—173 **19 Claims**

1. A composition for dyeing novoloid fibers, said composition comprising

1. from about 1 to about 10 percent anionic dye based upon fiber weight,
2. from about 3 to about 10 volume percent carrier medium selected from the group consisting of benzyl alcohol and benzyl alcohol/acetophenone,
3. from about 1 to about 10 volume percent formic acid,
4. from about 1 to about 5 volume percent acetic acid,
5. a small amount, less than 0.1 weight percent of surface active agent, and
6. water.

3,993,443

NOXIOUS VAPOR SUPPRESSION USING GLASS MICROBUBBLES WITH A FLUOROSILANE OR POLYFLUOROSILOXANE FILM

Richard A. Guenthner, Birchwood, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed June 25, 1974, Ser. No. 483,057

Int. Cl.² B01J *1/18*

U.S. Cl. 21—60.5 A **7 Claims**

1. The method of suppressing the evolution of noxious acidic vapor into the atmosphere from a body of volatile, inorganic liquid chemical which reacts with water, which comprises applying to the surface of said liquid body of chemical a treating agent comprising glass microbubbles having on the surfaces thereof an adherent film resulting from the application to said surfaces of a fluoroaliphatic radical-containing material selected from the group consisting of fluorosilane or poly(fluorosiloxane), so as to reduce the rate of flow of said evolved vapor from said body of liquid chemical.

3,993,444

INTERMITTENT TIME CONTROLLED VAPOR DISPENSING DEVICE

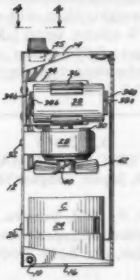
Edward Leslie Brown, 5538 Rio Rancho Way, Riverside, Calif. 92504

Filed Oct. 15, 1974, Ser. No. 514,467

Claims priority, application Germany, Oct. 17, 1973, 2351979

Int. Cl.² A61L *9/00, 9/01, 9/04*

U.S. Cl. 21—126 **8 Claims**



1. In combination with an open top container holding a quantity of a paste-like material that is volatile and vaporizes when a current of air at ambient temperature is discharged thereon, a device for intermittently discharging a current of air onto the exposed surface of said material for a predetermined period of time at spaced time intervals of substantial duration to transform a portion of said material into vapor that is discharged outwardly from said device as a plurality of streams thereof, said device including:

a. a housing assembly that includes a first opaque portion defined by an elongate rigid backwall that has a top member and bottom member projecting forwardly therefrom, and a second opaque portion that includes a vertical front wall and two laterally spaced side walls that have a plurality of small apertures therein, said second opaque portion being pivotally mounted to said first opaque portion to be pivotable between a first and a second position, when said second opaque portion is in a first position it defines a confined space within the interior of said housing, a first portion of said apertures serving to permit the flow of air into said confined space and a second portion of said apertures permitting the concurrent discharge of said air outwardly therethrough from said confined space in a substantially horizontal direction and substantial velocity to the ambient atmosphere, with said apertures of suffi-

ciently small size as to substantially obstruct viewing the interior of said housing from the exterior thereof;
b. first means for removably supporting said container in said confined space adjacent said bottom member;
c. a bladed fan in said confined space disposed above said container;
d. an electric motor that has a drive shaft to which said fan is secured;
e. second means for holding said motor, drive shaft and fan in a fixed position in said confined space in said housing;
f. a source of electricity; and
g. and interval timer operable intermittently at spaced time intervals of substantial duration to send electric current from said source to said motor to operate the latter for predetermined periods of time, with said fan as it is rotated by said motor, drawing air into said confined space through said first portion of apertures and discharging a current of air at substantial velocity onto the exposed surface of said material in said container to transform said material into vapor that with the air is discharged through said second portion of apertures as a plurality of said streams.

3,993,445

SINTERED FERRITIC STAINLESS STEEL

Orville W. Reen, Lower Burrell, Pa., assignor to Allegheny Ludlum Industries, Inc., Pittsburgh, Pa.

Filed Nov. 27, 1974, Ser. No. 527,575
Int. Cl.² B22F *3/00*; C22C *38/18*
U.S. Cl. 29—182.5 **7 Claims**

1. A fully sintered ferritic stainless steel powder compact being corrosion resistant in chloride ion environments consisting essentially of, by weight, 12 to 30% chromium, up to 8% molybdenum, up to 2% silicon, up to 1.5% manganese, up to 0.04% phosphorus, up to 0.04% sulfur, up to 0.15% carbon, balance iron; said steel compact having an overall density no greater than 80% of full density.

3,993,446

CEMENTED CARBIDE MATERIAL

Tadashi Okawa, Sakai, Japan, assignor to Dijet Industrial Co., Ltd., Osaka, Japan

Filed Nov. 7, 1974, Ser. No. 521,718
Claims priority, application Japan, Nov. 9, 1973, 48-126623
Int. Cl.² B22F *3/00*
U.S. Cl. 29—182.7 **12 Claims**

1. A cemented carbide material consisting essentially by weight of 70 to 90% of a carbide selected from the group consisting of tungsten carbide and a mixture of tungsten carbide and at least one transition metal carbide, the transition metal being one other than tungsten selected from Groups IV and VI of the Periodic Table, and 10 to 30% of a binder containing by weight 20 to 90% of nickel, 10 to 80% of cobalt and 5 to 25% of chromium as the base ingredients thereof, whereby said cemented carbide material has improved resistance to thermal cracking and is useful for plastic hot working.

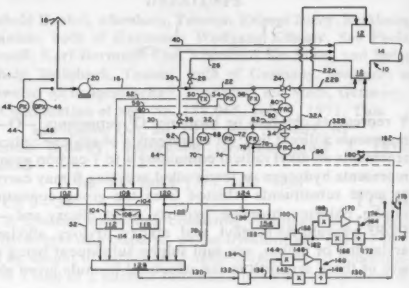
3,993,447

APPARATUS AND METHOD FOR CONTROL OF CARBON BLACK REACTOR

Russel A. Buss, and Galen D. Stacy, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Dec. 28, 1973, Ser. No. 429,138
Int. Cl.² C09C *1/48*
U.S. Cl. 23—259.5 **11 Claims**

1. In a carbon black production system including a reactor having a combustion zone and a reaction zone, a fuel supply conduit for injecting fuel into said combustion zone, and an air supply conduit, supplied by an air intake, for injecting air into said combustion zone, the improvement comprising:
a. means for establishing, in response to the characteristics of both the air and fuel injected into said combustion zone, a flame temperature signal representative of the flame temperature within said combustion zone; and



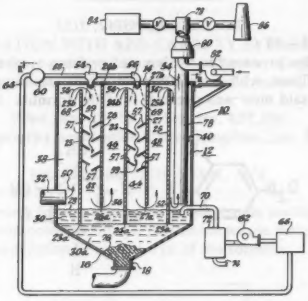
b. means for controlling the rate of flow of fuel through said fuel supply conduit in response to the difference between said flame temperature signal and a flame temperature set point signal representative of the desired flame within said combustion zone.

3,993,448

SCRUBBER AND COMBUSTION APPARATUS

Leroy Lowery, Sr., 610 Second St., Braddock, Pa. 15104

Filed Apr. 29, 1975, Ser. No. 572,734
Int. Cl.² B01J *6/00*
U.S. Cl. 23—262 **5 Claims**



5. A pollution control unit for treating contaminated gases, said unit comprising a tank having inlet and outlet compartments therein extending transversely of a serpentine flow path of said gases thru said tank, a plurality of spray and deentrainment compartments positioned in an alternating array between said inlet and said outlet compartments and likewise extending transversely of said gas flow, a series of spaced baffles defining said compartments, said baffles in addition defining said serpentine flow path of said gases in seriatim thru said compartments, said tank having a common sump communicating with lower end portions of each of said compartments, alternate ones of said baffles terminating beneath the surface of a liquid contained in said sump but short of a bottom of said tank in maintenance of a common character of said sump, said alternate baffles and the remainder of said baffles terminating respectively short of a top of said tank and short of said liquid surface in provision of said serpentine path, said remainder baffles sealingly engaging said tank top, and arrays of spray devices mounted on said tank top and communicating respectively with top portions of said spray compartments, each of said arrays likewise extending transversely of said fluid flow and substantially co-extending with the length of said spray compartments, said spray devices being disposed

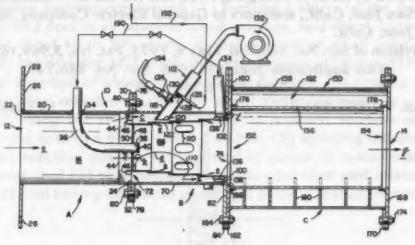
for directing water sprays downwardly into said gases and within said spray compartments only, the short terminations of said baffles being spaced sufficiently close to said tank top and to said liquid surface respectively for centrifugal deentrainment of said gases when passing around the associated baffle edges, said baffles and said compartments being elongated in the transverse direction of said fluid flow in provision of elongated flow slots between adjacent free edges of said baffles on the one hand and the tank top and the liquid surface respectively on the other hand for high volumetric flows through said tank, said outlet compartment being coupled to at least one combustion device for recirculating at least a portion of the gases passing thru said unit to said combustion device.

3,993,449

APPARATUS FOR POLLUTION ABATEMENT

J. H. Childs, North Olmsted, Ohio, assignor to City of North Olmsted, North Olmsted, Ohio

Filed Apr. 7, 1975, Ser. No. 565,604
Int. Cl.² F23G *7/06*
U.S. Cl. 23—277 C **16 Claims**



1. A two stage burner for oxidizing odorants contained in a gaseous effluent supply, said burner comprising:

an elongated burner housing including a gas flow passageway interconnecting an effluent gas inlet and a gas outlet with said inlet adapted to continuously receive a supply of effluent gas which is passed from said inlet toward said outlet through said passageway;

a primary burner disposed in said housing and longitudinally spaced in said passageway from said gas inlet toward said gas outlet and defining a primary combustion zone, said primary burner having a burner end wall generally transversely disposed in said passage and a burner side wall extending from said burner end wall toward said gas outlet with the terminal end thereof defining a gas exit area and with said burner side wall and burner housing defining a gas flow channel therebetween, said primary burner including first means for allowing a portion of said continuous supply of effluent gas to flow into said primary combustion zone through said primary burner end wall generally longitudinally of said passageway and through said primary burner side wall with at least some of the effluent gas entering said primary combustion zone through said primary burner side wall inducing recirculation gas flow vortices in said primary combustion zone adjacent at least said primary burner end wall, the remainder of said effluent gas flowing past said primary burner and combustion zone through said gas flow channel;

first means for separately supplying a combustible fuel to said primary combustion zone adjacent said burner end wall for mixing with at least a portion of effluent gas;

means communicating with said primary combustion zone for igniting the mixture of fuel and effluent gases therein;

a secondary burner disposed in said housing and having a secondary burner side wall defining an elongated secondary combustion zone having a greater cross-sectional dimension than the cross-sectional dimension than the exit area of said primary combustion zone area, said secondary combustion zone having an entrance area adjacent the exit area of said primary combustion zone and an exhaust area spaced toward said gas outlet, said primary and secondary combustion zones in longitudinal gas flow communication with each other with said secondary burner including second means for allowing said remainder of effluent gas to flow into said secondary combustion zone;

means disposed adjacent said secondary combustion zone entrance area for producing turbulent recirculation vortices in said remainder of effluent gas whereby said remainder passes through said secondary combustion zone closely spaced to the secondary burner side wall, said at least a portion of said gas exiting from said primary combustion zone passing generally longitudinally through said secondary combustion zone toward said burner housing gas outlet; and,

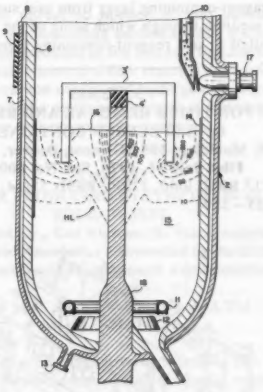
second means for separately supplying a combustible fuel to said secondary combustion zone adjacent the entrance area thereof for mixing with said remainder of said effluent gas to promote combustion thereof throughout said secondary combustion zone, the mixture of combustible fuel and said remainder of effluent gas being ignited by combustion in said primary combustion zone.

3,993,450

ELECTRODE ASSEMBLY FOR A FLUIDIZED BED APPARATUS

Frank C. Schora, Jr., Palatine, Ill.; Charles W. Matthews, Pittsburgh, Pa., and Ted M. Knowlton, Hinsdale, Ill., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Feb. 19, 1975, Ser. No. 551,225
Int. Cl.² B01J *1/00*; **H05B** *3/60*
U.S. Cl. 23—284 **9 Claims**



1. In a fluidized bed reactor apparatus which comprises a closed reactor vessel having a fluidizing means and a bed means adapted to contain a fluidized solid particle bed, an improved electrical heating means comprising an electrode assembly consisting of a high voltage electrode means positioned at the upper area of the bed and adapted, by positioning, to be free of particle contact when the bed is quiet but immersed in the bed when the bed is fluidized, said high voltage electrode having a generally hollow cylindrical shape with an opening at the bottom and being electrically connected to a high voltage source; an electrically grounded support electrode means connected to the vessel wall at the bottom thereof and arranged in the central portion of the particle bed,

said support electrode means extending through said bottom opening into said hollow cylindrical shape to support said high voltage electrode means by electrically insulated means and being positioned within the cylindrical surface defined by said high voltage electrode means, and an electrically grounded liner electrode means arranged concentrically around and spaced from both said high voltage electrode means and from said support electrode means.

3,993,451

TEST FOR A GIVEN CONSTITUENT IN A LIQUID

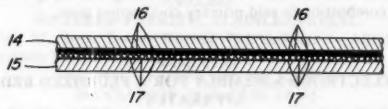
Bruno J. Verbeck, San Diego, Calif., assignor to Miles Laboratories, Inc., Elkhart, Ind.

Continuation of Ser. No. 265,645, June 23, 1972, Pat. No. 3,847,553, which is a continuation-in-part of Ser. No. 64,090, July 24, 1970, Pat. No. 3,672,845, which is a continuation of Ser. No. 703,002, Feb. 5, 1968, abandoned. This application Nov. 8, 1974, Ser. No. 521,971

The portion of the term of this patent subsequent to June 27, 1989, has been disclaimed.

Int. Cl.² C12K *1/10;* **G01N** *31/22, 33/16*

U.S. Cl. 23—253 TP **2 Claims**



1. A multi-layer testing device for use in analysis of a sample of liquid material applied thereto, comprising a plastic film support having adhered to one surface thereof a reagent-containing layer, said reagent reacting with a component of said sample to produce a color change within said layer, said layer also containing reagent-free particles of hydrophilic, particulate material adhered to said surface, and on the opposite side of said reagent-containing layer from said support, a layer of a porous medium through which some of the said component is transmitted to said reagent-containing layer.

3,993,452

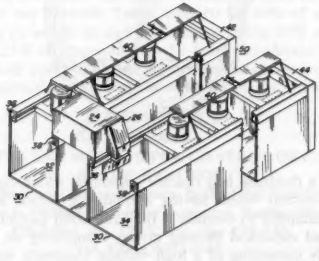
DEVICE FOR TIMED REMOVAL AND REPLACEMENT OF A SPECIMEN CONTAINER

Thomas S. Moulding, 1954 Glencoe, Denver, Colo. 80220

Filed July 31, 1975, Ser. No. 600,645

Int. Cl.² B01L *9/00, 11/00;* **B65D** *55/14;* **E05B** *73/00*

U.S. Cl. 23—259 **11 Claims**



1. An apparatus for providing time indications between which a specimen container is rendered available for use, comprising:

time stamp receiving means associated with a specimen container;

a time recording means for registering time indications on said time stamp receiving means, the time registrations including a beginning time indication when the specimen container is first rendered available for use and an ending time indication when the specimen container is last available for use, said time recording means being operative to register the time indications when actuated;

means for actuating said time recording means when the specimen container is first rendered available for use and is last available for use, said actuating means operating when said time stamp receiving means is in condition to receive time registrations from the time recording means, said actuating means being operatively connected with said time recording means; and,

means in conjunction with said actuating means for preventing the use of the specimen container until said actuating means has been operated to first actuate said time recording means and for preventing its use after said actuating means has been operated to last actuate said time recording means.

3,993,453

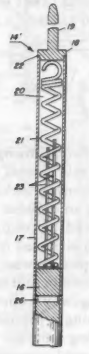
GETTER FOR NUCLEAR FUEL ELEMENTS

Wilfred T. Ross, Wilmington, N.C., and Harold E. Williamson, San Jose, Calif., assignors to General Electric Company, San Jose, Calif.

Division of Ser. No. 358,736, May 9, 1973, Pat. No. 3,969,185. This application June 13, 1975, Ser. No. 586,747

Int. Cl.² B23P *3/00*

U.S. Cl. 29—191.2 **13 Claims**



1. A composite getter comprising a metallic substrate having thereon a coating of a material capable of gettering reactive gases covering at least a portion of the substrate with the substrate having a greater coefficient of thermal expansion than the coating and being capable of producing tensile stress in said coating during said thermal expansion whereby said coating is intermittantly fractured by changes in temperature of said composite getter to thereby expose fresh gettering surfaces in said coating.

3,993,454

ALUMINA FORMING COATINGS CONTAINING HAFNIUM FOR HIGH TEMPERATURE APPLICATIONS

Charles Stanley Giggins, Jr., Simsbury, and Bernard Henry Kear, Madison, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed June 23, 1975, Ser. No. 589,654

Int. Cl.³ C22C *19/00*

U.S. Cl. 29—194 **8 Claims**

1. An article suitable for use at elevated temperatures which comprises

a. a superalloy base material

b. a coating on the superalloy base material having a composition of from about 10 to about 45 percent chromium,

from about 6 to about 25 percent aluminum, from about 0.5 to about 3 percent hafnium, balance selected from the group consisting of nickel and cobalt and mixtures thereof, said hafnium being present in elemental form in solid solution,

said coating tending to form an external continuous alumina layer and an internal discontinuous amount of hafnium oxide at elevated temperatures, whereby the hafnium oxide serves to anchor the alumina layer and reduce spallation.

3,993,455
REMOVAL OF MINERAL MATTER INCLUDING PYRITE FROM COAL

Leslie Reggel, Pittsburgh; Raphael Raymond, Bethel Park, and Bernard D. Blaustein, Pittsburgh, all of Pa., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed June 25, 1973, Ser. No. 354,023
Int. Cl.[2] C10L *9/10*; C10B *57/00*; C01B *31/02*
U.S. Cl. 44—1 R **3 Claims**

1. A method for treating coal to lower pyrite and mineral matter content comprising (1) forming a slurry of the finely divided coal in an aqueous alkali solution, said slurry containing about 40 to 200 grams of coal per liter of alkali solution, (2) maintaining said slurry at a temperature of about 225° C for a period of about 15 minutes to 6 hours, (3) cooling the resulting reaction mixture to about room temperature, (4) acidifying the reaction mixture with a dilute solution of a strong acid to a pH of about 2 or less, (5) agitating the acidified reaction mixture for a period of about 30 minutes to 6 hours, and (6) recovering particulate coal from said mixture, said coal having a reduced pyrite and mineral matter content.

3,993,456
PROCESS FOR DESULFURIZING PIPELINED COAL

Edward L. Cole, Fishkill, and Matthew A. McMahon, Wappingers Falls, both of N.Y., assignors to Texaco Inc., New York, N.Y.

Filed Feb. 24, 1975, Ser. No. 552,395
Int. Cl.[2] C10L *9/10*, *1/32*
U.S. Cl. 44—1 R **6 Claims**

1. A process for reducing the pyritic sulfur content of coal as it is being transported in a pipeline as a coal-water slurry from a slurry preparation plant to a dewatering plant which comprises injecting said slurry in at least one point upstream of said dewatering plant with a pyrite oxidant solution at a temperature of between about 70° and 100° F. under turbulent flow conditions characterized by a Reynolds Number of about 2000 to about 3000.

3,993,457
CONCURRENT PRODUCTION OF METHANOL AND SYNTHETIC NATURAL GAS

Robert P. Cahn, Milburn; John P. Longwell, and Stephen L. Wythe, both of Westfield, all of N.J., assignors to Exxon Research and Engineering Company, Linden, N.J.

Continuation-in-part of Ser. No. 384,061, July 30, 1973, abandoned. This application Nov. 26, 1975, Ser. No. 635,367
Int. Cl.[2] C10K *3/04*
U.S. Cl. 48—197 R **21 Claims**

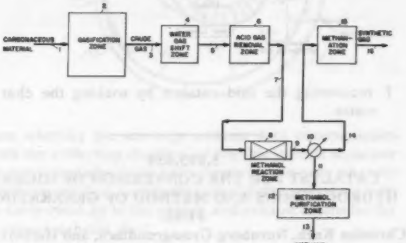
1. An integrated process for the production of methanol and a synthetic natural gas, which is substantially methane, from a carbonaceous material which comprises the steps of:

a. Gasifying the carbonaceous material in a first reaction zone at sufficient pressure and temperature to produce a synthesis gas stream comprising methane, carbon monoxide, carbon dioxide, hydrogen, and steam, in which the synthesis gas contains about 5°–30 mole % methane on a dry basis;

b. Passing said synthesis gas stream to a second reaction zone wherein at least a portion of said carbon monoxide is reacted with at least a portion of the steam present therein and is converted at a sufficient temperature and pressure and in the presence of a water gas shift conversion catalyst, to carbon dioxide and hydrogen, thereby producing a converted gas stream with the proviso that the shift conversion is controlled to such an extent as to provide the necessary stoichiometry for the subsequent production of methanol and additional quantities of methane;

c. Passing said converted stream to a third zone wherein the sulfur compounds and a major portion of the carbon dioxide in said converted stream are removed therefrom to produce a purified stream;

d. Passing said purified stream into a fourth reaction zone wherein a portion of the carbon oxides and hydrogen in



said purified stream are converted, in the presence of a methanol conversion catalyst and at a sufficient temperature and at pressures ranging from 400 to about 1500 psig, to methanol;

e. Recovering methanol from said fourth reaction zone and separately recovering the unreacted portion of said purified stream which contains a reduced amount of carbon oxides;

f. Passing the unreacted portion of said purified stream containing the remaining carbon oxides, hydrogen, and the methane produced in the first reaction zone from said fourth reaction zone to a fifth reaction zone wherein said remaining carbon oxides and hydrogen are converted, in the presence of a methanation catalyst and at a sufficient temperature and pressure, to methane.

3,993,458
METHOD FOR PRODUCING SYNTHETIC FUELS FROM SOLID WASTE

Michael J. Antal, Jr., Los Alamos, N. Mex., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Mar. 28, 1975, Ser. No. 563,274
Int. Cl.[2] C10J *3/00*
U.S. Cl. 48—209 **6 Claims**

1. A method of producing gases such as CO_2, CO, CH_4, and H_2 from the pyrolysis and gasification of solid organic waste contained within a reactor comprising:

a. solar heating by means of a solar top furnace to a temperature of 600°–700° C a working fluid selected from the class consisting of steam, CO_2, or a mixture of these gases, said working fluid contained in the lower section of said reactor situate at the focus of the said solar top furnace,

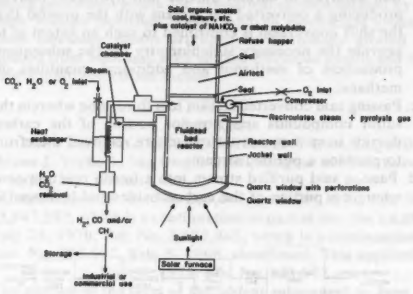
b. mixing at least one catalyst selected from the class consisting of $NaHCO_3$ and cobalt molybdate with the solid organic waste,

c. injecting under pressure the heated working fluid into a porous reactant bed on which is situate the catalyst-mixed organic waste,

d. pyrolyzing the catalyst-mixed organic waste causing the formation of CO_2, CO, CH_4, and H_2 gases, and a char

residue,

e. extracting the gases and char from the reactor, and



f. recovering the said catalyst by soaking the char with water.

3,993,459

CATALYST FOR THE CONVERSION OF HIGHER HYDROCARBONS AND METHOD OF GENERATING A FUEL

Christian Koch, Nurnberg-Grossgrundlach, and Herbert Stenger, Ochenbruck, both of Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany

Filed Apr. 28, 1975, Ser. No. 572,515

Claims priority, application Germany, Apr. 30, 1974, 2421051

Int. Cl.² C01B 2/16; B01J 23/10, 23/76

U.S. Cl. 48—212 **14 Claims**

1. A catalyst for the conversion of higher hydrocarbons into a reformed gas and at least one of methane and hydrogen comprising:

a. an oxide carrier material; and

b. active catalyst components contained on said oxide carrier material consisting of oxides containing 54 to 90% by weight of lanthanum, 2 to 29% by weight of cobalt, 1 to 10% by weight of nickel, 0.1 to 8% by weight of uranium and 0.1 to 9% by weight of cerium and thorium, referred to the total content of active metal components in the catalyst.

3,993,460

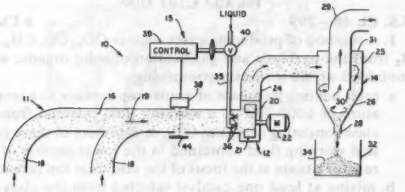
DUST CONTROL SYSTEM

Jan W. Gooch, and Aloysius J. Wrape, both of Little Rock, Ark., assignors to Chlortrol Inc., Little Rock, Ark.

Filed July 18, 1975, Ser. No. 597,131

Int. Cl.² B01D 47/06

U.S. Cl. 55—92 **18 Claims**



1. In a process of treating an air stream to remove particulate from the air stream wherein an air stream is moved by fan means to a centrifugal separator and fluid including a substantial amount of moisture is injected into the air stream prior to its entering the separator to contact the particles and make the particles heavier so that the particles will be separated from the air stream in the centrifugal separator, the improvement therein comprising the steps of detecting the opacity of the air stream and proportioning the quantity of fluid injected into the air stream in response to the opacity of the air stream.

3,993,461

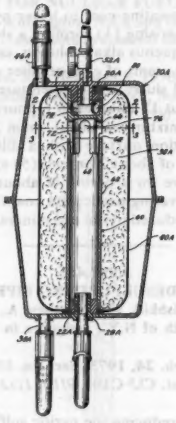
CARDIOTOMY RESERVOIR

Ronald J. Leonard, Harvard, and Jonathan Wayne Takagishi, Arlington Heights, both of Ill., assignors to Baxter Laboratories, Inc., Deerfield, Ill.

Continuation-in-part of Ser. No. 381,311, July 20, 1973, Pat. No. 3,891,416. This application Dec. 9, 1974, Ser. No. 531,018

Int. Cl.² B01D 19/02

U.S. Cl. 55—178 **8 Claims**

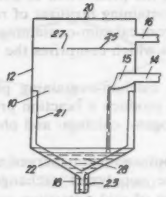


1. A reservoir for the collection, purification, and storage of blood during surgical procedures which comprises: a hollow blood storage casing having a first port positioned at one end thereof; a hollow member positioned within said casing and extending from end-to-end thereof, said hollow member having a bore positioned to communicate at one end thereof with said first port, said hollow member comprising (1) a tubular member having a wall free of perforations, said one end of the hollow member which is positioned to communicate with the first port being defined by an end of said tubular member, and (2) an adaptor member in engaged relation with the other end of said tubular member, and defining first port means for communication between the interior and exterior of said hollow member, said adaptor member being affixed to said casing end which is remote from the end of said casing which carries said first port, to firmly position said hollow member relative to said casing, said hollow member also carrying about its exterior filter and defoaming means for the purification of blood, a second port communicating through the casing in a position exterior to said hollow member, whereby a blood flow path is defined through said first port, hollow member, first port means, filter means, and second port; and a third port carried by said remote casing end and positioned in communication with said adaptor member.

3,993,462
POLYMER-GAS SEPARATOR

John Prys Morgan Jones, Pontypool, England, assignor to Imperical Chemical Industries Ltd., London, England

Continuation of Ser. No. 249,996, May 3, 1972, abandoned. This application June 14, 1974, Ser. No. 479,326
Claims priority, application United Kingdom, May 3, 1971, 12733/71
Int. Cl.² B01D 19/00
U.S. Cl. 55—204 8 Claims



1. An apparatus for separating gas from a molten polymer comprising a generally curvilinear vessel for the collection of molten polymer, said vessel comprising an inner generally concave wall with an inlet for a polymer-gas mixture, an outlet for gas and an outlet for polymer, said inlet for the polymer-gas mixture being positioned in said wall in a substantially sideways relationship thereto and in a downward slope of 5° to 30° from the horizontal, said inlet terminating in polymer-gas separating means having an increased diameter at the terminal end thereof for reducing polymer velocity and directing incoming polymer quietly and smoothly to a pool of molten polymer, said polymer-gas separating means additionally having an enlarged slotted open area on the upper terminal portion thereof to allow the gas to separate from the polymer in a direction away from the pool of molten polymer and to leave via the vessel gas outlet and wherein said vessel polymer outlet is positioned in the lower portion of said vessel and said vessel polymer-gas inlet and said gas outlet are positioned above said vessel polymer outlet.

3,993,463
PARTICLE SEPARATOR FOR TURBINE ENGINES OF AIRCRAFT

Samuel R. Barr, Swampscott, Mass., assignor to The United States of America as represented by the Secretary of the Army, Alexandria, Va.

Filed Aug. 28, 1975, Ser. No. 608,484
Int. Cl.² B01D 39/00
U.S. Cl. 55—306 5 Claims

1. In a gas turbine engine particle separator of the scroll type, in combination, a first inertial particle separator for coarse particle removal, and a second inertial particle separator in series therewith for the removal of fine particles,

the first inertial separator comprising an air inflow pipe,

a curved section to said pipe adapted to effect an initial centrifugal gradient of particulate matter in inlet air, and

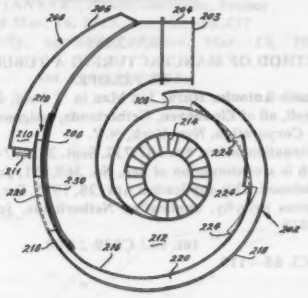
a collection chamber disposed on the outside of the curved section of said inflow pipe to trap coarse particles centrifuged therein,

particle removal means within said collecting chamber,

the second inertial separator comprising

a helicoidal duct adapted to form an air flow passageway to the engine, means connecting said duct to the air inflow pipe, inner wall means within the duct spaced inwardly from the duct outer wall and involuted therewith to form a curved outer scavenge exhaust duct and an inner separator helicoidal air duct,

a plurality of discharge openings in said inner wall adapted to admit to said scavenge exhaust duct particles centrifuged to the outside circumference of the inner separator air duct,

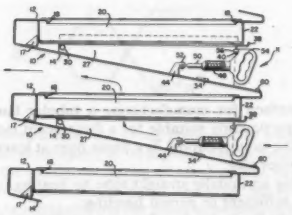


means whereby the scavenge exhaust duct communicates with the collecting chamber of the first inertial separator to carry particles from both separators, means whereby the inner air duct communicates with the engine air inlet to carry clean air to the engine, and exhaust means for the scavenge exhaust duct.

3,993,464
AIR FILTER

André E. Pelabon, Paris, France, assignor to ANF Frangeco S.A., Paris, France

Continuation of Ser. No. 350,813, April 13, 1973, abandoned. This application Jan. 23, 1975, Ser. No. 543,463
Int. Cl.² B01D 46/10
U.S. Cl. 55—480 7 Claims



1. In air filter supports of the type wherein a rectangular caisson is subdivided into a plurality of superposed pairs of similar compartments, each of said compartments being wedge-shaped, the apex of each wedge being closed, the peripheral margins of the base of each wedge defining a vertical, rectangular opening of substantially greater area than said closed end, the two compartments of each pair being oppositely disposed with respect to each other, whereby the open end of one compartment of each pair is disposed on one side of the caisson to define an air inlet and the open end of the other compartment of each pair defines an air outlet disposed on the opposite side of the caisson, the two compartments of each pair being separated by a common horizontal wall having an opening therein, a perforated air filter tray removably positioned beneath said opening through which air passes from said air inlet to said air outlet, the top of the upper compartment and the bottom of the lower compartment being defined by respective parallel, inclined, imperforate walls, a wedge-shaped slide means removably received in said one compartment for supporting said air filter tray in horizontal, operative position in said opening in said common wall, said

slide means being slidable on the inclined wall of the lower compartment in one direction for placing said filter tray in said operative position and being movable in the opposite direction to remove the filter tray from said one compartment.

3,993,465

METHOD OF MANUFACTURING A TUBULAR LAMP ENVELOPE

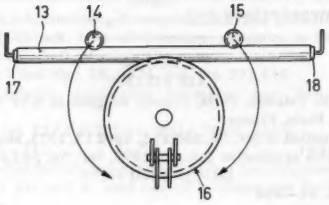
Adrianus Antonius Hurx; Jan Man in 'T Veld, and Peter Ivan Sygall, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 507,732, Sept. 20, 1974, abandoned, which is a continuation of Ser. No. 369,551, June 13, 1973, abandoned. This application Apr. 28, 1975, Ser. No. 572,528

Claims priority, application Netherlands, June 27, 1972, 7208818

Int. Cl.² C03B *23/08*

U.S. Cl. 65—110 **7 Claims**



1. A method for manufacturing a tubular lamp envelope which is particularly suitable for a fluorescent lamp envelope wherein the tube is curved in a plane over at least a part of its length comprising:

softening an initially straight tube by heating to a temperature sufficient to permit bending;

urging the heated tube around a bending jig having a circumferential surface having a groove for cooperation with the tube by means of one or more bending members, said bending jig having said circumferential surface disposed in a generally horizontal plane;

inflating the tube to produce a substantially circular cross-section;

cooling the tube to a predetermined temperature just sufficient to avoid deformation of the shape of the tube as a result of gravity forces; and

providing a supporting member having a generally planar surface disposed in a horizontal plane;

providing holding members separate from said bending members, said holding members being carried on said supporting member;

holding the tube in a horizontal plane by means of said holding members and interrupting said urging step as soon after start of said holding as said predetermined temperature has been reached;

at least part of said inflating step and at least a part of said cooling step being performed contemporaneously, said holding step being accomplished with said supporting member.

3,993,466

FERTILIZER PRODUCTION

Knud Christen Bayer Knudsen, Toftevej, Denmark, assignor to Aktieselskabet Dansk Svovlsyre-OG Superphosphat-Fabrik, Copenhagen, Denmark

Continuation of Ser. No. 737,814, June 18, 1968, abandoned. This application Dec. 27, 1972, Ser. No. 316,301

The portion of the term of this patent subsequent to Mar. 28, 1989, has been disclaimed.

Int. Cl.² C05B *11/06*

U.S. Cl. 71—33 **1 Claim**

1. A process for the production of a nitrogen-, potassium- and phosphorus-containing fertilizer of reduced calcium and chlorine content from calcium-containing phosphate rock and potassium chloride which comprises the following sequential steps:

a. reacting the calcium-containing phosphate rock with nitric acid to produce a reaction product mixture comprising a nitrogen-, calcium- and phosphorus-containing solution;

b. contacting a potassium ion-charged, sulphonated styrene-divinylbenzene copolymer exchange resin, wherein at least a portion of said potassium ion-charged exchange resin may be replaced with an ammonium ion-charged exchange resin, with said solution whereby at least part of the calcium ions of the solution is exchanged with the potassium ions and ammonium ions;

c. separating the calcium ion-containing exchange resin from the thus treated solution, the latter being worked up to yield the fertilizer;

d. contacting the separated calcium-ion-containing exchange resin with a solution of potassium chloride containing a sufficient amount of ammonium ions to effect regeneration by exchanging the said calcium ions with potassium and ammonium ions, whereby calcium chloride solution is formed;

e. separating the resulting regenerated ion-exchange resin from the calcium chloride solution; and

f. recycling the separated regenerated ion-charged exchange resin to Step (b).

3,993,467

HYDROXYALKYL ESTERS OF N-PHOSPHONOMETHYL GLYCINE AND THE HERBICIDAL USE THEREOF

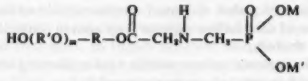
John E. Franz, Crestwood, Mo., assignor to Monsanto Company, St. Louis, Mo.

Division of Ser. No. 495,011, Aug. 5, 1974, Pat. No. 3,948,975. This application Nov. 13, 1975, Ser. No. 631,764

Int. Cl.² A01N *9/36*

U.S. Cl. 71—86 **10 Claims**

1. A herbicidal composition comprising a herbicidally effective amount of a compound of the formula



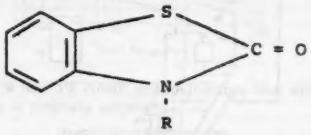
wherein R is an alkylene or alkoxy substituted alkylene containing up to 18 carbon atoms, R′ is alkylene or alkoxy substituted alkylene groups containing from 2 to 4 carbon atoms, *m* is an integer of from 0 to 3 and M is hydrogen and M′ is hydrogen, alkali metal, alkaline earth metal, ammonium or organic ammonium together with an inert carrier.

3,993,468
USE OF 3-SUBSTITUTED BENZOTHIAZOLINES AS PLANT GROWTH REGULANTS

John J. D'Amico, St. Louis, Mo., assignor to Monsanto Company, St. Louis, Mo.

Filed May 12, 1975, Ser. No. 576,512
Int. Cl.² A01N 9/12
U.S. Cl. 71—90 7 Claims

1. A method for enhancing the sucrose content of sugar-bearing plants which comprises treating said sugar-bearing plants with an effective amount of a compound of the formula



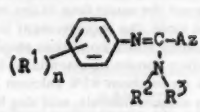
wherein R is selected from the group consisting of $-CH_2CN$, $-(CH_2)_2CN$, $-CHCOOCH_3$ and $-CH_2CONH_2$.

3,993,469
AZOLYLAMIDINE COMPOUNDS AND HERBICIDAL COMPOSITIONS

Erik Regel, Wuppertal; Ludwig Eue, and Robert R. Schmidt, both of Cologne, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Apr. 8, 1974, Ser. No. 459,156
Claims priority, application Germany, Apr. 27, 1973, 2321330
Int. Cl.² C07D 233/90
U.S. Cl. 71—92 28 Claims

1. Azolylamidine compound of the formula



(I)

wherein

n is an integer from 0 to 2, inclusive,

R^1 is individually selected from halogen, alkyl, alkoxy, alkylthio, haloalkoxy, haloalkylthio, halophenoxy and haloalkyl and contains not more than 6 carbon atoms;

R^2 is selected from hydrogen, alkyl, or cycloalkyl and contains not more than 7 carbon atoms;

R^3 is selected from hydrogen, alkyl, and cycloalkyl and contains not more than 7 carbon atoms;

R^2 and R^3, taken together represent a lower alkylene bridge of up to 5 carbon atoms;

Az is an imidazolyl radical selected from imidazol-1-yl and imidazol-1-yl substituted with at least one of alkyl of up to 6 carbon atoms, halogen and nitro provided that there is not more than one nitro substituent

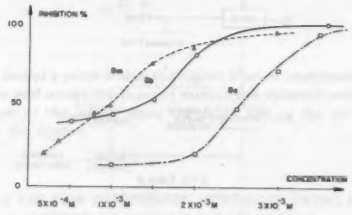
and salts thereof with physiologically tolerated acids.

25. Herbicidal composition comprising herbicidally acceptable carrier and, in effective amounts, an azolylamidine compound as claimed in claim 1.

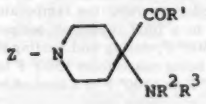
3,993,470
PROCESS FOR CONTROLLING THE GROWTH OF DICOTYLEDONS

Bernard Devaux, Villeurbanne, and Henri Pacheco, Lyon, both of France, assignors to Agence Nationale de Valorisation de la Recherche (ANVAR), Neuilly-sur-Seine, France

Filed Mar. 14, 1975, Ser. No. 558,437
Claims priority, application France, Mar. 13, 1974, 74.08457
Int. Cl.² A01N 9/22
U.S. Cl. 71—94 3 Claims



1. A process for controlling the growth of dicotyledons, which comprises applying to the seeds prior to or after their germination a herbicidally effective amount of a compound of the formula:



wherein Z is selected from the group consisting of hydrogen, benzyl, or parachlorobenzyl, R' is a group OR in which R is selected from the group consisting of alkyl groups having a from 1 to 12 carbon atoms, cyclohexyl, and lower phenylalkyl; and R^2 and R^3 are selected from the group consisting of hydrogen, benzyl, and their acid addition salts of non-phytotoxic acids acceptable in agriculture.

3,993,471
METHOD FOR MANUFACTURE OF REDUCED PELLETS

Ryoichi Yoshimura, Yokohama, and Takashi Shoji, Chichibu, both of Japan, assignors to Showa Denko Kabushiki Kaisha, Tokyo, Japan

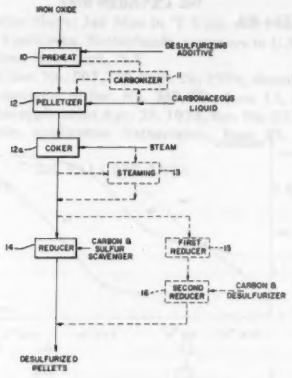
Filed Sept. 5, 1975, Ser. No. 610,745
Claims priority, application Japan, Sept. 9, 1974, 49-103016
Int. Cl.² C22B 1/08
U.S. Cl. 75—3 5 Claims

1. In a method for the manufacture of reduced pellets by mixing a powdered mineral ore with anthracite, pelletizing the resultant mixture with a binder added thereto and subsequently roasting the formed pellets, an improvement characterized by heating said anthracite to a temperature between 600° C and 1,000° C, pulverizing said heat-treated anthracite and then forming pellets which comprise said powdered mineral ore, said anthracite and said binder.

3,993,472
DESULFURIZATION OF IRON OXIDE PELLETS

Raymond H. Long, Morristown, N.J., and William V. Bauer, New York, N.Y., assignors to The Lummus Company, Bloomfield, N.J.

Filed Aug. 19, 1974, Ser. No. 498,665
Int. Cl.² C22B 1/24, 1/11
U.S. Cl. 75—4 **26 Claims**



1. A process for producing prereduced iron oxide pellets fron an iron oxide pellet containing a desulfurizing amount of a desulfurizing additive and integral carbon, at least a portion of which was produced from a sulfur containing carbonaceous material, comprising:

heating said iron oxide pellets containing said desulfurizing additive and integral carbon in an amount sufficient to effect from 20 percent to 85 percent prereduction of the iron oxide pellets to raise the temperature of the iron oxide pellets to a final reduction temperature of from 1800° F to 2500° F, during said heating the temperature of the pellets being raised from 1500° F to a temperature of from 1800° F to 2500° F in a time of less than 1 hour; and

steaming said iron oxide pellets for a period of at least 0.25 hour in an atmosphere having a steam partial pressure of at least 0.04 atm. and maintaining the iron oxide pellets at the reduction temperature and provide a prereduced iron oxide pellet having a sulfur content of no greater than 0.03 weight percent, said steaming being effected prior to completion of the reduction.

3,993,473
METHOD OF REDUCING IRON OXIDE

Donald R. MacRae, Bethlehem, Pa., assignor to Bethlehem Steel Corporation, Bethlehem, Pa.

Filed Mar. 20, 1975, Ser. No. 560,269
Int. Cl.² C21C 5/52; C22B 1/10
U.S. Cl. 75—11 **6 Claims**

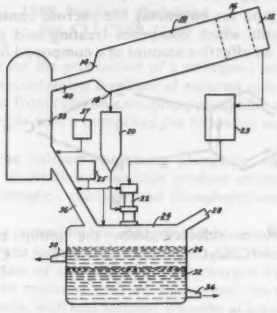
1. A method of reducing iron oxides, comprising:

a. feeding iron oxides, carbon monoxide, and hydrogen through a first reduction unit heated to a temperature sufficient to permit partial reduction of said iron oxides to occur;

b. feeding the partially reduced iron oxides from said first reduction unit into a plasma arc reduction unit to substantially reduce said oxides and produce a gaseous effluent comprising carbon monoxide and water;

c. collecting the substantially reduced iron oxides in a receiving vessel wherein any unreduced oxides are reduced and a gaseous effluent comprising carbon monoxide and water is formed;

d. passing methane and at least a portion of the gaseous effluents formed in said plasma arc reduction unit and said receiving vessel into a natural gas reformer, disposed between said receiving vessel and said first reduction unit, to react the water in said effluents with said methane to



produce carbon monoxide and hydrogen and to substantially reduce the temperature of said effluents; and

e. feeding at least a portion of the carbon monoxide and hydrogen produced in said natural gas reformer to said first reduction unit.

3,993,474
FLUID MOLD CASTING SLAG

James Earl Roberts, Rome Township, Ohio, assignor to Huntington Alloys, Inc., Huntington, W. Va.

Continuation-in-part of Ser. No. 373,983, June 27, 1973. This application June 6, 1975, Ser. No. 584,470
Int. Cl.² C22B 9/10; B22D 21/00
U.S. Cl. 75—94 **16 Claims**

1. In a method for fluid-mold casting ingots made of a nickel-containing metal, wherein a quantity of molten casting slag is placed in the bottom of an ingot mold and the ingot-forming molten metal is poured through the slag pool to cause the slag to float toward the top of the ingot in advance of the rising molten metal during the teeming of the ingot, whereby the slag solidifies continuously against the ingot mold surface and forms a shell between the outer face of the ingot and the inner face of the ingot mold, the improvement for producing an ingot face of high quality which comprises employing as the casting slag a composition consisting essentially, by weight, of more than about 80% up to about 95% calcium fluoride and the balance essentially sodium fluoride, said slag having a flow point on heating in the temperature range of about 2100° to about 2400° F and a melting point below the melting point of the nickel-containing metal being cast.

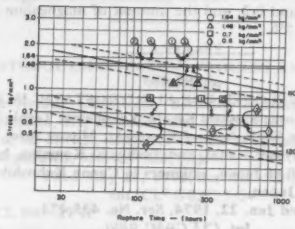
3,993,475
HEAT RESISTING ALLOYS

Kohsaburo Harada, Tokyo; Yousuke Matsumoto, and Rokurou Kiyoshima, both of Kanagawa, all of Japan, assignors to Duraloy Blaw-Knox, Inc., Scottdale, Pa.

Filed Apr. 18, 1975, Ser. No. 569,499
Claims priority, application Japan, Apr. 20, 1974, 49-43906
Int. Cl.² C22C 30/00
U.S. Cl. 75—134 F **6 Claims**

1. An alloy characterized by high creep strength at elevated temperatures in the range 1,100° C. to 1,200° C., by resistance to corrosion, particularly in the form of oxidation, by resistance to thermal shock and by unusual stress rupture characteristics at elevated temperatures consisting of, by weight, about 0.3% to 0.9% carbon, about 20% to 30% chromium,

about 26% to 40% nickel, about 0.8% to 4.0% manganese, about 0.9% to 3.5% silicon, about 0.3% to 5.0% tungsten,



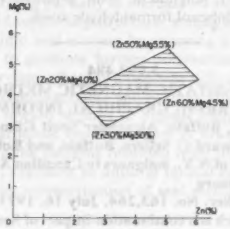
about 3.5% to 8.5% cobalt and the balance iron with residual impurities in ordinary amounts.

3,993,476

ALUMINUM ALLOY

Keiichi Koike, Matsudo, Japan, assignor to Hitachi, Ltd., Japan

Filed Feb. 12, 1975, Ser. No. 549,287
Claims priority, application Japan, Feb. 20, 1974, 49-19511
Int. Cl.² C22C 21/10
U.S. Cl. 75—141 **5 Claims**



1. A castable strong aluminum alloy consisting essentially of, by weight, 2.0 – 6.0% zinc and 3.0 – 5.5% magnesium, the zinc and magnesium being present in amounts indicated by the hatched area in the drawing, and 0.5 – 1.5% copper, 0.05 – 0.5% chromium and 0.05 – 0.5% titanium, said alloy additionally containing two or more of, by weight, 0.05 – 0.3% antimony, 0.05 – 0.2% cerium and 0.05 – 0.3% zirconium, the balance being aluminum and incidental impurities.

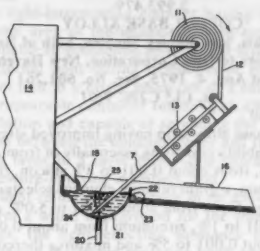
3,993,477

SODIUM ADDITION TO ALUMINUM

Paul D. Hess, Lower Burrell, and Robert E. Spear, Murrysville, both of Pa., assignors to Aluminum Company of America, Pittsburgh, Pa.

Filed Oct. 21, 1974, Ser. No. 516,610
Int. Cl.² C22C 1/02
U.S. Cl. 75—148 **2 Claims**

1. The method of adding sodium to molten aluminum alloy containing silicon as an alloying element in hypoeutectic percentages, which comprises (a) taking extended tubing predominantly of aluminum, (b) preheating it to a temperature in the range from 300° F. through 400° F., (c) filling it with molten sodium, (d) crimping it closed at the ends, (e) thereafter causing the previously mentioned molten aluminum alloy to move in a stream, there being a sump with inert gas bubbling up from the bottom in the stream and a dam with an orifice in it in the stream creating higher level of aluminum for a certain distance above it and there being a layer of molten salt material on the surface of the stream above the dam, (f) taking the previously mentioned tubing enclosing the sodium and (g) progressively and continuously at a controlled rate inserting one end of the tubing into and beneath the surface of the stream in a direction countercurrent to the flow of the



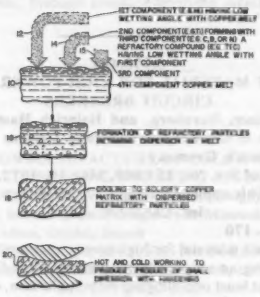
stream and at a point within the higher level of aluminum from the dam and under the layer of molten salt material and at or upstream of the sump, while the other end of the tubing is outside the stream.

3,993,478

PROCESS FOR DISPERSOID STRENGTHENING OF COPPER BY FUSION METALLURGY

Donald A. Hay, Medfield; Peter T. Gregg, Shirley, both of Mass., and Walter L. Finlay, New York, N.Y., assignors to Copper Range Company, New York, N.Y.

Continuation of Ser. No. 225,003, Feb. 9, 1972, abandoned.
This application Feb. 4, 1974, Ser. No. 439,624
Int. Cl.² C22C 9/00, 9/06
U.S. Cl. 75—159 **6 Claims**



1. A process for producing a dispersoid strengthened copper composition, said process comprising the steps of heating a copper base matrix to a temperature above its melting point to form a melt, said copper base matrix consisting essentially of copper, dissolving in said melt a bridging metal consisting essentially of nickel, dispersing titanium as as a refractory component metal in said melt, dispersing carbon in said melt to produce in situ within said melt a refractory titanium carbide dispersoid by reaction between said refractory dispersoid titanium metal and said refractory dispersoid carbon nonmetal, said titanium carbide refractory dispersoid having a low wetting angle with respect to said nickel bridging metal and a high wetting angle with respect to said matrix, said titanium carbide refractory dispersoid having a melting point of at least 3000° C., cooling said melt to a temperature below its melting point, and working said copper composition in order to reduce at least one of its geometrical dimensions, said titanium carbide refractory dispersoid ranging in total volume from 0.1 to 10%, said copper being present in sufficient concentration to

impart an I.A.C.S. of at least 31% at temperatures ranging from room temperature to 1800° F.

3,993,479
COPPER BASE ALLOY
Harvey P. Cheskis, and Stanley Shapiro, both of New Haven, Conn., assignors to Olin Corporation, New Haven, Conn.
Filed Aug. 4, 1975, Ser. No. 601,261
Int. Cl.² C22C 9/01
U.S. Cl. 75—160 9 Claims

1. A copper base alloy strip having improved stress rupture life and hot rollability consisting essentially of from about 2 to 9.5% aluminum, from about 0.001 to 3% silicon, from about 0.2 to 1% titanium, a grain refining element selected from the group consisting of iron from about 0.001 to 5.0%, chromium from about 0.001 to 1%, zirconium from about 0.001 to 1%, cobalt from about 0.001 to 5% and mixtures thereof, and the balance copper.

3,993,480
LEAD-ANTIMONY ALLOY
Armin Ueberschaer, Frankfurt am Main; Ulrich Heubner, Bad Homburg, and Max Reinert, Stolberg, all of Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Germany
Filed Jan. 28, 1975, Ser. No. 544,717
Claims priority, application Germany, Jan. 28, 1974, 2403849
Int. Cl.² C22F 11/10
U.S. Cl. 75—166 C 8 Claims

1. Lead-antimony alloy consisting of
0.5–3.5% by weight antimony,
0.025–0.3% by weight arsenic,
0.005–0.1% by weight selenium,
0.002–0.05% by weight tin,
0.01–0.1% by weight copper,
balance lead.

3,993,481
CONTACT MATERIAL FOR HIGH-POWER VACUUM CIRCUIT BREAKERS
Horst Schreiner, Nurnberg, and Heinrich Hassler, Wendelstein, both of Germany, assignors to Siemens Aktiengesellschaft, Munich, Germany
Division of Ser. No. 251,889, May 10, 1972, Pat. No. 3,948,652. This application Sept. 17, 1975, Ser. No. 614,224
Int. Cl.² C22C 19/03
U.S. Cl. 75—170 2 Claims

1. A contact material for high-power vacuum circuit breakers comprising an alloy consisting essentially of a base metal cobalt, and at least one alloying metal tellurium, characterized by containing at least one auxiliary metal tin forming a eutectic with said base metal, said eutectic comprising about 15% to about 50% of the total volume of said alloy, said eutectic surrounding crystals consisting mainly of said base metal, said alloying metal being contained in said crystals and comprising not more than 5% by weight of said crystals and being dispersed in said eutectic to an extent of less than 5% by weight of said eutectic, and said alloy having an alloying formulation consisting essentially to 1% by weight of tellurium and 10% by weight of tin, with the balance being the cobalt base metal.

3,993,482
ANTICORROSION ZINC BASED COATING MATERIAL
Roberto Brunno, Rome, Italy, assignor to Dalmine S.p.A., Milan, Italy
Filed Jan. 8, 1975, Ser. No. 539,586
Int. Cl.² C22C 18/00
U.S. Cl. 75—178 A 3 Claims

1. A zinc based coating material, for use in protecting ferrous surfaces against corrosion, said material also including magnesium, aluminum and chromium in which the percentage ratio between magnesium and aluminum is between 1.5 and 5, the percentage ratio between chromium and magnesium is between 0.03 and 0.2, and the amount of magnesium is between 1% and 5%.

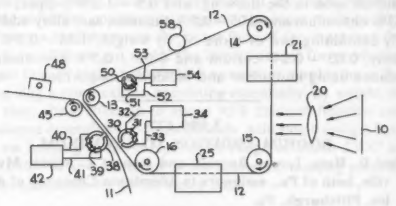
3,993,483
LIQUID DEVELOPER FOR ELECTROSTATIC IMAGE
Isamu Maki, Hoya; Masashi Kiuchi, Yokohama; Toshio Watanabe; Saburo Shoji, both of Kawasaki; Mitsuo Sato, Yokohama; Tatsuyoshi Kanai, and Toshiyuki Komatsu, both of Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan
Filed Jan. 22, 1974, Ser. No. 435,474
Int. Cl.² G03G 9/00
U.S. Cl. 96—1 LY 10 Claims

1. Liquid developer for electrostatic image prepared by dispersing toner in an electrically insulating liquid characterized in that the liquid developer further contains at least one member selected from the following group A and at least one member selected from the following group B.

Group A: cumarone indene resin, rosin modified phenol resin, rosin modified maleic acid resin, rosin modified pentaerythritol resin, alkylphenol modified xylene resin, styrene-vinyl toluene copolymer, and resin acid calcium salt.

Group B: low molecular polyethylene, ethylene-ethylacrylate copolymer, ethylene-vinyl acetate copolymer, low molecular polypropylene, chlorinated paraffin (degree of chlorination, 40 to 70%), polybutene resin, β-pinene resin, polyterpene resin, alkylphenol formaldehyde resin.

3,993,484
ELECTROSTATIC-MAGNETIC METHOD OF TRANSFERRING GRAPHICAL INFORMATION
Joseph M. Ralt, Buffalo; Alexander Scott Gilmour, Jr., Williamsville; Edward C. Sellers, Buffalo, and Robert L. Talley, New York, all of N.Y., assignors to Canadian American Bank S.A., Luxembourg
Division of Ser. No. 163,264, July 16, 1971, Pat. No. 3,804,511, which is a continuation-in-part of Ser. No. 59,185, July 29, 1970, abandoned. This application Sept. 24, 1973, Ser. No. 400,003
Int. Cl.² G03G 13/01, 13/16, 19/00
U.S. Cl. 96—1.4 20 Claims



1. A method of transferring graphical information from an original medium to a copy medium comprising the steps of:

a. forming an electrostatic image of said graphical information on a surface of a recording means which is magnetizable and capable of supporting electrostatic images;

b. applying magnetic toner particles to a surface of said recording means in a manner such that said particles adhere to said surface in a correspondence with said electrostatic image;

c. forming a magnetic image corresponding to said electrostatic image on a surface of said recording means by utilizing the location of said toner particles on said recording means to influence an applied magnetic field in a manner forming said magnetic image; and

d. transferring said toner particles from said recording means to said copy medium while leaving said magnetic image on said recording means.

3,993,485
PHOTOPOLYMERIZATION PROCESS AND RELATED DEVICES

Edwin Arthur Chandross, Berkeley Heights; Walter John Tomlinson, III, Holmdel, and Heinz Paul Weber, Middletown, all of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed May 27, 1975, Ser. No. 580,929
Int. Cl.² G03C 5/04
U.S. Cl. 96—27 H **8 Claims**

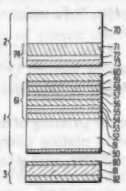
1. A process comprising the steps of positioning in a supporting structure a mixture of at least two components of respectively differing photopolymerization reactivities and respectively differing optical polarizabilities, partially polymerizing the mixture, writing a pattern in the partially polymerized mixture by exposing it to optical radiation in a corresponding pattern and of a wavelength suitable for the photopolymerization, and fixing the mixture against the subsequent changes in polymerization.

6. A process comprising mixing cyclohexyl methacrylate and a substantially comparable molecular proportion of N-vinylcarbazole and a substantially smaller proportion of benzoin methyl ether as a photosensitive initiator, flowing said mixture into position in a supporting structure, initially photopolymerizing partially to increase its viscosity to prevent flow along said supporting structure, writing a pattern of index of refraction into said mixture by exposing it to optical radiation adapted to promote further polymerizing of the cyclohexyl methacrylate, whereby a two-way diffusion of the monomer cyclohexyl methacrylate and N-vinylcarbazole occur, said methacrylate toward regions of highest optical intensity and said N-vinylcarbazole toward regions of lowest optical intensity, and fixing the patterns resulting from the two-way diffusion by a final exposure to uniform optical radiation selected to complete the polymerization of said mixture.

3,993,486
DIFFUSION TRANSFER COLOR PHOTOGRAPHIC FILM UNIT WITH COMPOSITE OF IMAGE-RECEIVING ELEMENT WITH LIGHT INTERCEPTING ELEMENT

Yasushi Oishi, Minami-ashigara, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed June 4, 1974, Ser. No. 476,241
Claims priority, application Japan, June 4, 1973, 48-63157
Int. Cl.² G03C 7/00, 5/54, 1/48, 1/40
U.S. Cl. 96—29 D **50 Claims**



1. A diffusion transfer color photographic film unit,

a. which contains:

1. a light-sensitive element comprising a transparent support having thereon at least one light-sensitive silver halide emulsion layer having associated therewith a dye image-forming material which, as a result of development, forms an imagewise distribution of a dye image-forming material capable of diffusing through a processing solution;

2. an image-receiving element comprising a transparent support having thereon an image-receiving layer for receiving the dye image-forming material upon diffusion;

3. a light-intercepting element having substantially the same area as the image-receiving element and being capable of protecting an emulsion layer or layers from external light during development processing of the film unit in a bright place out of a camera;

4. a rupturable container retaining an alkaline processing solution and capable of spreading the processing solution between the emulsion layer and the image-receiving layer in a layer form upon rupture by means of pressure-applying members; and

5. a light-reflecting substance in an amount sufficient to form a white background for the transferred dye images, the light-reflecting substance being positioned between the image-receiving layer and the light-sensitive emulsion layer of the light-sensitive element, said light-reflecting substance being located in a layer coated on the image-receiving layer, in the alkaline processing solution, or in combinations of these locations,

b. in which the image-receiving element and the light-intercepting element are relatively fixed at least at one edge in a parallel face-to-face alignment, with the image-receiving layer directed inside, to form a composite having an opening for introducing the light-sensitive element therebetween after imagewise exposure thereof at a location outside the composite so that the image-receiving layer faces the light-sensitive emulsion layer of the light-sensitive element,

c. means for placing said light-sensitive element into said composite after imagewise exposure, and

d. said film unit being adapted to be passed, after imagewise exposure of the light-sensitive element and introduction of the light-sensitive element through the opening of the composite, through pressure-applying members.

3,993,487
METHOD FOR MANUFACTURE OF COLOR TELEVISION PICTURE TUBES USING ROTATING LIGHT SOURCE

Kakuichiro Hosokoshi, Neyagawa, and Shigeya Ashizaki, Takatsuki, both of Japan, assignors to Matsushita Electronics Corporation, Osaka, Japan

Filed Feb. 18, 1975, Ser. No. 550,631
Claims priority, application Japan, Feb. 18, 1974, 49-19723
Int. Cl.² G03C 5/00
U.S. Cl. 96—36.1 **3 Claims**

1. A method of manufacturing a color television picture tube having a face-panel, a light sensitive film coated over the inner surface of said face panel and a shadow mask having a plurality of slots therein spaced from said face-panel, said tube having a main axis essentially perpendicular to the surface of said face-panel and said shadow mask, wherein said method comprises the steps of:

disposing a light source providing a light emitting point opposite said face-panel, said shadow mask being located between said face-panel and said light source, and

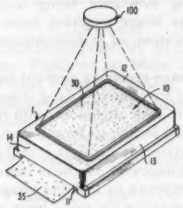
rotating said light emitting point about an axis which is substantially parallel to the main axis of said tube to produce a ring-shaped secondary light source while continuously displacing said secondary light source relative to said film in the longitudinal direction of the slots in said shadow mask along a line of predetermined length from one end thereof to the other, said secondary light source being stopped at the midpoint of said line for a predetermined period of time, said light sensitive film thereby being selectively exposed to said light source.

3,993,488

PHOTOGRAHIC FILM ASSEMBLY COMPRISING LIGHT INTERCEPTING ELEMENTS LOCATED BEHIND PRESSURE PLATE

Yasushi Oishi, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Aug. 14, 1974, Ser. No. 498,005
Claims priority, application Japan, Aug. 14, 1973, 48-91049
Int. Cl.² G03C 1/48, 1/40; G03D 9/02
U.S. Cl. 96—76 C 14 Claims



1. A photographic film assemblage comprising in combination

a container insertable in and removable from a photographic exposure apparatus for enclosing a plurality of light-sensitive sheets stacked in planar parallel relation and including a forward wall having a rectangular opening to permit exposure of the forwardmost light-sensitive sheet, and a withdrawal opening permitting withdrawal of said light-sensitive sheets following exposure thereof within said container;

a pressure plate located within said container maintaining the plane of the light-sensitive sheets parallel to the plane of the rectangular opening.

a plurality of light-sensitive sheets, each of which comprises a transparent support having thereon, in sequence, at least one silver halide light-sensitive emulsion layer and a light-intercepting layer of a hydrophilic colloid containing a light absorbent in an amount necessary to prevent, upon exposure, any light-sensitive sheet lying behind the forwardmost light-sensitive sheet from being fogged, said light-sensitive sheet being retained in the container such that the support is directed toward said rectangular opening;

a plurality of light-intercepting sheets for covering the support surface of an exposed light-sensitive sheet substantially the same size as the light-sensitive sheets and possessing a light-absorbency necessary to protect the light-sensitive sheets from ambient light outside the exposure apparatus and said light-intercepting sheets being retained between the pressure plate and the rear wall of said container;

means for shifting exposed light-sensitive sheets and for shifting and superimposing said light-intercepting sheets on said light-sensitive sheets after exposure.

3,993,489

MULTI-COLOR LAMINATE OF PHOTOPOLYMER THAT IS IMAGE-WISE HYDROPEROXIDIZED

Robert A. Heimsch, St. Louis, and Eric T. Reaville, Webster Groves, both of Mo., assignors to Monsanto Company, St. Louis, Mo.

Division of Ser. No. 415,845, Nov. 14, 1973, Pat. No. 3,925,076, which is a division of Ser. No. 115,727, Feb. 16, 1971, Pat. No. 3,790,389, which is a continuation-in-part of Ser. No. 644,121, June 7, 1967, abandoned. This application Sept. 26, 1975, Ser. No. 617,123
Int. Cl.² G03C 1/40, 1/68
U.S. Cl. 96—77 1 Claim

1. A multi-color image laminate comprising a substrate having a coating of appreciable thickness of a polymer having carbon-to-carbon double bond unsaturation, said polymer containing some portions which have been hydroperoxidized by imagewise exposure to light in the presence of oxygen, and other portions that have not been subjected to said exposur wherein either the exposed or non-exposed portions contain coloring materials at different levels of the laminate to present a multi-color image to the viewer.

3,993,490

DIRECT POSITIVE PHOTOGRAPHIC ELEMENTS CONTAINING DEVELOPERS

Manfred Schober, Offenbach, Main, and Wolfgang A. Augstein, Urberach, both of Germany, assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Feb. 6, 1975, Ser. No. 547,749
Claims priority, application Germany, Feb. 12, 1974, 2406515
Int. Cl.² G03C 1/06, 5/24
U.S. Cl. 96—95 7 Claims

1. A direct-positive silver halide photographic film comprising a film support, at least one photosensitive prefogged silver halide emulsion layer, a gelatin-containing layer interposed between said silver halide emulsion layer and the film support, and a developer combination comprising hydroquinone monosulfonate and a superadditively-acting auxiliary developer selected from the group consisting of N-methyl-p-aminophenol sulfate, 1-phenyl-3-pyrazolidone, 4-methyl-1-phenyl-3-pyrazolidone, 4-ethyl-1-phenyl-3-pyrazolidone, 4-isopropyl-1-phenyl-3-pyrazolidone, 4,4-dimethyl-1-phenyl-3-pyrazolidone, 5-methyl-1-phenyl-3-pyrazolidone, and 5,5-dimethyl-1-phenyl-3-pyrazolidone; at least one component of said developer combination being incorporated in said gelatin-containing layer.

3,993,491

ELECTROLESS PLATING

Nathan Feldstein, Princeton, N.J., assignor to Surface Technology, Inc., Princeton, N.J.

Continuation-in-part of Ser. No. 422,774, Dec. 7, 1973, abandoned. This application Nov. 8, 1974, Ser. No. 521,901
Int. Cl.² C23C 3/02
U.S. Cl. 106—1 7 Claims

1. A solution useful in the priming of dielectric substrates in preparation for electroless plating comprising stannous and cuprous ions in aqueous media, said stannous to cuprous ions being present in said aqueous media in a molar ratio of at least 1:1.

3,993,492

WATER SOLUBLE TRANSFER COATING MATERIAL AND ARTICLES INCORPORATING SAME

Otis Bill Woolly, 1702 Lyndale, Ennis, Tex. 75119

Filed Apr. 14, 1975, Ser. No. 567,819
Int. Cl.² C09D 11/12, 3/387, 3/393
U.S. Cl. 106—19 10 Claims

1. A water soluble transfer material adapted for pressure

transfer to a receptor surface and removable from said surface by application of cold water, consisting essentially of:

from about 8 to about 35% by weight of a non-ionic emulsifier;

from about 15 to about 50% by weight of a medium molecular weight polyethylene glycol having an average molecular weight between about 2,000 and about 4,500;

from about 20 to about 30% by weight of a high molecular weight polyethylene glycol having an average molecular weight between about 6,000 and about 7,500;

from about 17 to about 27% by weight of a low molecular weight polyethylene glycol having an average molecular weight between about 400 and about 800; and

from about 2 to about 8% by weight of a color imparting non-resinated pigment having an average particle size between about 1 and about 5 microns.

3,993,493

INKS CONTAINING ISOCYANATED IMIDES OF HYDROCARBON ANHYDRIDES AND BLENDS THEREOF

Robin A. McLaren, Ballwin, and Charles Alcott, St. Louis, both of Mo., assignors to Petrolite Corporation, St. Louis, Mo.

Division of Ser. No. 788,947, Jan. 3, 1969, abandoned, Ser. No. 361,765, May 18, 1973 is a continuation of said Ser. No. 788,947. This application Aug. 9, 1971, Ser. No. 170,375

Int. Cl.² C09D *11/00, 11/02, 11/06*

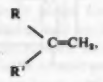
U.S. Cl. 106—20 **8 Claims**

1. A carbon paper ink containing a coloring material, a vehicle and the reaction product of

1. an organic isocyanate or a mixture of organic isocyanates and

2. an imide of a member selected from the group consisting of

i. an olefin-maleic compound adduct prepared by reacting (a) a maleic compound selected from the group consisting of maleic acid, citraconic acid, ethylmaleic acid, glutaconic acid, itaconic acid, methylitaconic acid the anhydride of each of said acids and an ester derivative of each of said acids with (b) an olefin of the formula R—CH=CH_2 or of the formula



where R is a hydrocarbon radical of 9–100 carbon atoms and R′ is hydrogen or $H(CH_2)_n$, *n* being 1–100, and

ii. a wax-maleic compound graft copolymer prepared by reacting (a) a maleic compound selected from the group consisting of maleic acid, a citraconic acid, ethylmaleic acid, glutaconic acid, itaconic acid, methylitaconic acid, the anhydride of each of said acids and an ester derivative of each of said acids with (b) a wax selected from the group consisting of plastic microcrystalline waxes, tank bottom microcrystalline waxes, solvent extracted microcrystalline waxes, Fischer-Tropsch waxes, polyalkylene hydrocarbon waxes and blends thereof.

3,993,494

POWDERED MATERIAL PARTING AGENT

Tage Nyman, Bromma, Sweden, assignor to AB Wet Talc, Enskede, Sweden

Filed Oct. 25, 1974, Ser. No. 517,874

Claims priority, application Norway, Oct. 30, 1973, 4184/73

Int. Cl.² B28B *7/36*

U.S. Cl. 106—38.22 **2 Claims**

1. A powder composition consisting of (i) talc particles and (ii) dioctyl phthalate as an anti-dusting agent on the surface of said talc particles, said dioctyl phthalate being in an amount between about 1% and 15% by weight of the total of said talc and said dioctyl phthalate.

3,993,495

POROUS CERAMIC ARTICLES AND METHOD FOR MAKING SAME

André Paul Galliath, Valencia, and Valentine Eugene Weis, Glendale, both of Calif., assignors to Interpace Corporation, Parsippany, N.J.

Filed July 29, 1974, Ser. No. 492,423

Int. Cl.² C03C *3/22;* **B28B** *7/28, 7/34*

U.S. Cl. 106—40 R **13 Claims**

1. A fired porous article of desired shape having no surface flaws, a uniform open porosity of at least 20% by volume and an average pore size in the range of 1 to 10 microns, high abrasion resistance and good permeability and a modulus of rupture of at least 4,000 psi, the fired article being substantially the same size as the corresponding unfired article; and consisting essentially of 30 to 90% by weight of refractory abrasive particles and 70 to 10% by weight of silica glass particles said abrasive particles being bonded to each other by said silica glass particles, said bond being formed by solid sintering and said silica glass particles containing crystals of an alumino-silicate which were formed in situ during bonding of the abrasive particles.

3,993,496

EMULSIFIED ASPHALT EMULSION FORTIFIED WITH ASBESTOS FIBERS

Clarence R. Bresson, and Forrest D. Spaulding, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 308,697, Nov. 22, 1972, Pat. No. 3,885,068. This application Mar. 7, 1975, Ser. No. 556,482

Int. Cl.² C08L *95/00;* **C09D** *3/24*

U.S. Cl. 106—277 **14 Claims**

1. A stable anionic asphalt-asbestos emulsion sealant composition comprising an anionic asphalt emulsion and a sufficient amount of suitable asbestos fibers to insure that when said asphalt-asbestos emulsion is employed to impregnate a fabric it will produce a cover structure capable of withstanding fluid or hydraulic pressure, said asbestos fibers having had a sufficient amount of nonionic surface-active agent applied thereto prior to the mixing of said fibers with said emulsion to insure that said fibers will not cause asphalt coagulation.

3,993,497

COATING COMPOSITIONS CONTAINING PRECIPITATED SILICA

Satish K. Wason, Havre de Grace, Md., assignor to J. M. Huber Corporation, Locust, N.J.

Division of Ser. No. 402,927, Oct. 3, 1973, abandoned. This application Feb. 13, 1975, Ser. No. 549,637

Int. Cl.² C09C *1/30*

U.S. Cl. 106—288 B **3 Claims**

1. A coating composition containing a flatting agent, said flatting agent comprising an amorphous precipitated silica having very high structure, a wet cake moisture in excess of 85%, an oil absorption in excess of 200 ccs/100g, and a surface area in excess of 250 m^2/g.

3,993,498

GRANULAR CARRIER MATERIAL

Gerald John Koekemoer, Verwoerdburg, South Africa, assignor to Cullinan Holdings Limited, South Africa

Filed Mar. 31, 1975, Ser. No. 563,883

Claims priority, application South Africa, Apr. 8, 1974, 74/2247

Int. Cl.² C04B *31/40;* **B02C** *19/12*

U.S. Cl. 106—288 B **27 Claims**

1. A process for producing a granular carrier material for pesticides from attapulgite which includes the steps of:

a. wet mixing perlite and attapulgite together in an aqueous medium to form a cake which comprises an intimate mixture of between 97 and 80% by weight of attapulgite

in finely divided form and between 3 and 20% by weight of heat expanded perlite in finely divided form, the attapulgite and perlite being of a particle size capable of passing through a 150 mesh ASTM screen;

b. heating the cake to a temperature of between 450° and 780° C; and

c. breaking up the cake to form a granular solid.

3,993,499

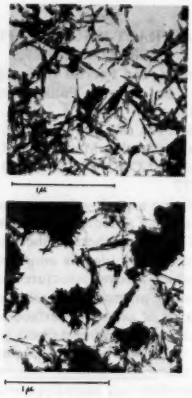
PROCESS FOR PRODUCING A PARTICULATE MULLITE FIBRIL CONTAINING COMPOSITION

Howard Wayne Jacobson, and George Leoutsacos Lewis, both of Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 512,138, Oct. 4, 1974, Pat. No. 3,951,677, which is a continuation-in-part of Ser. No. 206,058, Dec. 8, 1971, abandoned, which is a continuation-in-part of Ser. No. 69,931, Sept. 4, 1970, abandoned. This application July 16, 1975, Ser. No. 596,239

Int. Cl.² C01B *33/26*; C08K *3/34*

U.S. Cl. 106—288 B **10 Claims**



1. A process for producing a particulate aluminum silicate composition consisting essentially of a major amount of colloidal, nonspinnable, monocrystalline mullite fibrils and a minor amount of alumina and silica consisting essentially of

a. intimately mixing aluminum sulfate, a material that provides a source of silica for reaction and at least one alkali metal salt selected from the group consisting of alkali metal sulfate and alkali metal chloride as a flux in such proportions that the molar ratio of aluminum to silica, expressed as Al_2O_3/SiO_2, is between 2.6–6:2, and at least one alkali metal atom is present for each aluminum atom,

b. heating the mixture to a temperature of about 750°–1200° C., until the evolution of SO_3 ceases, and

c. washing and leaching the resultant particulate aluminum silicate composition.

3,993,500

REDUCED CHARGE MONTMORILLONITE PIGMENT FOR SENSITIZING RECORD MATERIAL

Peter A. H. Isaac, Summit, and T. Dixon Oulton, Watchung, both of N.J., assignors to Engelhard Minerals & Chemicals Corporation, Edison, N.J.

Filed Jan. 12, 1976, Ser. No. 648,163

Int. Cl.² C09C *1/28*

U.S. Cl. 106—288 B **14 Claims**

1. A sensitizing pigment for record material comprising micron-size particles of dioctahedral montmorillonite which had been subjected to ion-exchange treatment with a preselected quantity of lithium ions followed by heat treatment to collapse irreversibly the montmorillonite structure, said particles being capable when coated on paper of producing a stable intense blue image when printed with a solution of crystal violet lactone in an organic solvent.

3,993,501

NONAQUEOUS ELECTROCHEMICAL CELL

Tibor Kalnoki-Kis, Westlake, Ohio, assignor to Union Carbide Corporation, New York, N.Y.

Filed Mar. 24, 1975, Ser. No. 561,206

Int. Cl.² H01M *10/00*

U.S. Cl. 429—48 **10 Claims**

1. A nonaqueous electrochemical cell comprising an active metal anode selected from the group consisting of lithium, sodium, potassium and aluminum anodes, a cathode collector and an ionically conductive cathode-electrolyte solution containing a solute dissolved in a liquid oxyhalide active cathode depolarizer of an element of Group V or Group VI of the Periodic Table, the improvement which comprises the surface of the active metal anode that contacts the electrolyte coated with a vinyl polymer film which effectively prevents passivation of the anode during storage, said vinyl polymer film tenaciously adhering to the surface of the anode and being ionically permeable, electronically nonconductive and cathode-electrolyte insoluble.

3,993,502

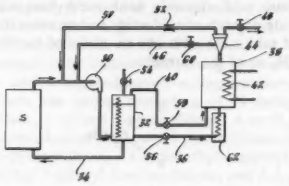
METAL HALOGEN HYDRATE BATTERY SYSTEM

Harry K. Bjorkman, Jr., Birmingham, Mich., assignor to Energy Development Associates, Madison Heights, Mich.

Filed Oct. 29, 1975, Ser. No. 626,793

Int. Cl.² H01M *47/00*

U.S. Cl. 429—51 **7 Claims**



1. In an electrical energy storage system, the combination of

at least one cell having a normally positive electrode for reducing a halogen disposed in electrical contact therewith and a normally negative electrode for oxidizing an oxidizable metal disposed in electrical contact therewith during an electrical discharge of said cell,

an aqueous electrolyte containing ions of said metal and halogen,

means for circulating said electrolyte through said cell in a first loop,

recharging means associated with said storage system including a source of electrical energy to effect an oxidation of the ions of said halogen to the elemental state,

means for recovering the elemental halogen produced, and

means for forming and storing a quantity of halogen hydrate from a mixture of said recovered halogen and water in said aqueous electrolyte during recharging of said storage system,

said circulating means circulating a portion of said electrolyte and said recovered elemental halogen through said halogen hydrate forming and storing means in a second loop,

whereby said circulating means can circulate said electrolyte between said cell and hydrate forming and storing means for progressively oxidizing said oxidizable metal

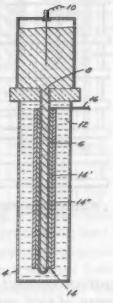
and decomposing said halogen hydrate during discharge of said cell to add halogen to said electrolyte for reduction of said halogen during discharge of said cell and can circulate said recovered halogen to said halogen hydrate forming and storing means during charging of said cell.

3,993,503

SECONDARY BATTERY OR CELL WITH COMPOSITE ELECTRODE

Frank A. Ludwig, Southfield, Mich., assignor to Ford Motor Company, Dearborn, Mich.

Filed Jan. 30, 1976, Ser. No. 653,858
Int. Cl.² H01M *10/00*
U.S. Cl. 429—103 **31 Claims**



1. A secondary battery or cell comprising:

A. one or more anodic reaction zones containing a molten alkali metal reactant-anode in electrical contact with an external circuit;

B. one or more cathodic reaction zones containing (1) a cathodic reactant which, when said battery or cell is at least partially discharged, is selected from the group consisting of (i) a single phase composition comprising molten polysulfide salts of said anodic reactant and (ii) a two-phase composition molten sulfur and molten sulfur saturated polysulfide salts of said anodic reactant and (2) an electrode which is at least partially immersed in said cathodic reactant; and

C. a cation-permeable barrier to mass liquid transfer interposed between and in contact with said anodic and cathodic reaction zones, said electrode being in electrical contact with both said cation-permeable barrier and said external circuit, wherein the improvement comprises a composite electrode comprising

a. at least one first portion of porous conductive material which

i. is disposed adjacent to said cation-permeable barrier and is in electrical contact therewith,

ii. is contiguous at least in part with said cation-permeable barrier and

iii. is formed of a material which, during operation of said battery or cell, exhibits a contact angle with said molten polysulfide which is less than the contact angle it exhibits with sulfur, and

b. at least one second portion of porous material which

i. is disposed adjacent to said at least one first portion and is contiguous at least in part therewith,

ii. is in electrical contact with said cation-permeable barrier and

iii. is formed of a material which, during operation of said cell, exhibits a contact angle with said molten sulfur which is less than the contact angle it exhibits with said molten polysulfide,

said at least one first portion serving primarily as the electrode during charge of said battery or cell and serving primarily to wick molten polysulfide away from said at least one second portion during discharge and said at least one second portion serving primarily as the electrode during discharge of said battery or cell and serving primarily to wick molten sulfur away from said at least one first portion during charge.

3,993,504

METHOD FOR THE MANUFACTURE OF A NEGATIVE ELECTRODE CONTAINING A DISCHARGE RESERVE FOR GAS-TIGHT ALKALINE STORAGE BATTERIES

Günter Kramer; Peter Ness, both of Kelkheim, and Hans-Hermann von Döhren, Frankfurt am Main, all of Germany, assignors to Varta Batterie Aktiengesellschaft, Kelkheim, Taunus, Germany

Filed Dec. 5, 1975, Ser. No. 638,173
Claims priority, application Germany, Feb. 25, 1975, 2507988
Int. Cl.² H01M *35/18*
U.S. Cl. 427—126 **8 Claims**

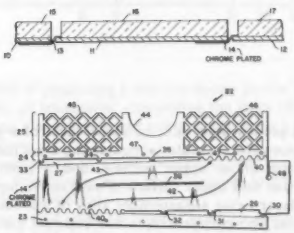
1. In a method for the manufacture of a negative cadmium electrode containing a discharge reserve for gas-tight alkaline storage batteries involving forming an electrode structure which contains cadmium hydroxide the improvement which comprises incorporating in said electrode structure an organic cadmium compound which will thermally dissociate and heating said electrode structure containing said organic cadmium compound to decompose said organic cadmium compound and produce a discharge reserve in said negative cadmium electrode.

3,993,505

INTERCONNECTOR FOR COMPONENTS SUCH AS SOLAR CELLS OR THE LIKE

George J. Pack, Sr., Los Angeles, Calif., assignor to Hughes Aircraft Company, Culver City, Calif.

Filed May 27, 1975, Ser. No. 581,020
Int. Cl.² H01L *31/02*; H01R *5/02*
U.S. Cl. 136—89 **11 Claims**



2. An interconnector for components comprising:

a generally rectangular, thin conductive sheet;

said sheet having first and second connecting surfaces extending along two opposite edges thereof for fastening to components;

said sheet having first and second elongated openings extending inward from the other two opposite edges thereof adjacent said connecting surfaces to define a connecting path extending generally from one end of said first connecting surface to the diagonally opposite end of said second connecting surface;

said elongated openings being provided with ties extending thereacross, said ties being easily breakable to open said elongated openings when said connecting surfaces begin to move apart.

6. A solar cell array comprising:

first and second solar cells each having a bottom surface defining a bottom electrode, and a conductive strip extending along a top edge defining a top elec.rode;

a generally rectangular piece of thin conductive metal foil defining an interconnector;

said interconnector having first and second elongated connecting surfaces extending along two opposite edges thereof, said first connecting surface being connected to the bottom electrode of said first solar cell, and said second connecting surface being connected to the top electrode of said second solar cell;

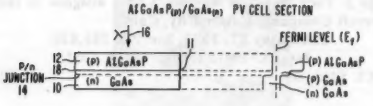
said interconnector having first and second elongated openings extending inward from the other two opposite edges thereof adjacent said connecting surfaces to define a connecting path extending generally from one end of said first connecting surface to the diagonally opposite end of said second connecting surface.

3,993,506

PHOTOVOLTAIC CELL EMPLOYING LATTICE MATCHED QUATERNARY PASSIVATING LAYER

Ronald L. Moon, Menlo Park, Calif., assignor to Varian Associates, Palo Alto, Calif.

Filed Sept. 25, 1975, Ser. No. 616,723
Int. Cl.² H01L *31/06, 29/34*
U.S. Cl. 136—89 **10 Claims**



1. In a photovoltaic cell, an active layer of a gallium arsenide semiconductive material containing a p-n junction within one micron of its upper surface, and a passivating layer formed over said upper surface of said active layer, said passivating layer being a quaternary alloy of aluminum, gallium, arsenic and phosphorus with lattice constant matched to that of said active layer and having a bandgap substantially greater than that of said active layer.

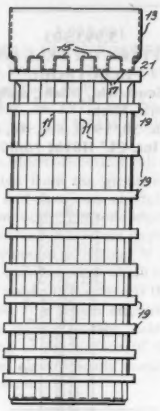
3,993,507

BATTERY JAR

James S. Hardigg, Baptist Hill, Conway, Mass. 01341

Filed May 13, 1974, Ser. No. 469,498
Int. Cl.² H01M *2/02;* **B65D** *5/40*
U.S. Cl. 426—176 **2 Claims**

1. A battery jar comprising an elongated casing of a plastic material, said casing including a plurality of vertical ribs extending along a substantial portion of the length thereof and having a plurality of hoop supporting surfaces formed in a plurality of transverse rows about the external periphery of said casing, a plurality of hoops positioned about said casing and fixed with respect thereto by said hoop supporitng surfaces and supporting means positioned about the periphery of



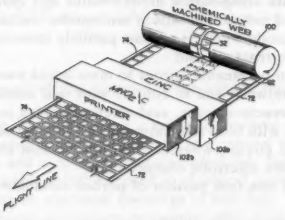
said casing and in surface contact with an abutting vertical force supporting portion of said casing.

3,993,508

METHOD FOR MANUFACTURING FLAT BATTERIES

Irving Erlichman, Wayland, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed June 20, 1975, Ser. No. 588,695
Int. Cl.² H01M *6/00*
U.S. Cl. 29—623.2 **28 Claims**



1. In a method for constructing multicell batteries wherein intermittent deposits of electrode materials, separator means and electrolyte are provided in spaced relationship along select zones over a continuous electrically conductive polymeric web, at least one select zone of said web present at an initial stage of said method as a laminate of said polymeric material and continuous metal material for deriving externally disposed metal current collector surfaces of said batteries, said zones being compiled and subsequently severed transversely and parallel to the manufacturing flight line direction of zone movement to derive discrete ones of said batteries, the improvement comprising the step of removing select portions of said sheet metal material to provide discrete and mutually spaced components of said sheet metal remaining laminated with said continuous polymeric material to define discrete current collector assemblies for said batteries.

3,993,509

SEMICONDUCTOR DEVICE MANUFACTURE

Gordon Kenneth McGinty, Norley, England, assignor to U.S. Philips Corporation, New York, N.Y.

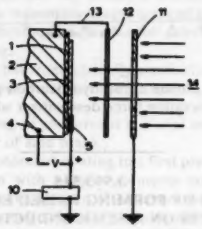
Filed Oct. 29, 1974, Ser. No. 518,226

Claims priority, application United Kingdom, Nov. 7, 1973, 51619/73

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 10, 1976

Int. Cl.² H01L *21/263*

U.S. Cl. 148—1.5 10 Claims



1. A method of holding a semiconductor wafer against a support while effecting a processing step at the surface of the wafer remote from the support, comprising the steps of:

positioning a solid dielectric layer between facing surfaces of a support and a semiconductor wafer, said support and wafer being conductive, at least adjacent to said facing surfaces thereof, said dielectric layer preventing physical and electrical contact between said facing surfaces; and

applying a potential difference between said facing surfaces, thereby clamping said wafer against said support by electrostatic force across said dielectric layer.

3,993,510

THIXOTROPIC CHEMICAL CONVERSION MATERIAL FOR CORROSION PROTECTION OF ALUMINUM AND ALUMINUM ALLOYS

Peter N. Bellavin, deceased, late of New Castle, Del. by Anna K. Bellavin, legal representative, assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 21, 1975, Ser. No. 579,515

Int. Cl.² C23F *7/26*

U.S. Cl. 148—6.2 4 Claims

1. A thixotropic chemical conversion material, for use in the corrosion protection of aluminum and aluminum alloys, comprising, in parts by weight: 1.5 to 4.0 parts conversion material comprising an aqueous solution of

chromic acid, potassium ferricyanide, barium nitrate and sodium

fluosilicate; 3.0 to 5.0 parts thickener comprising colloidal silicon dioxide; and 0.1 to 0.4 parts surfactant comprising an aqueous solution of poly-oxy

ethylene lauryl ether.

3,993,511

HIGH TEMPERATURE ELECTRICAL CONTACT FOR PELTIER-INDUCED LIQUID PHASE EPITAXY ON INTERMETALLIC III-V COMPOUNDS OF GALLIUM

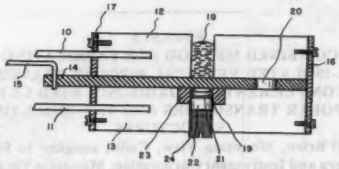
Joseph John Daniele, Mohegan Lake, N.Y., assignor to North American Philips Corporation, New York, N.Y.

Filed May 30, 1975, Ser. No. 582,164

Int. Cl.² H01L *21/208*

U.S. Cl. 148—172 7 Claims

1. In a method wherein liquid phase epitaxial growth on a solid substrate is induced or altered by passing an electrical current through the liquid-solid interface, an improved method for making electrical contact to the substrate when the substrate is an intermetallic III-V compound of gallium, comprising the steps of pressing a substantially flat graphite surface with which electrical contact may be made toward a



substantially flat clean surface of a substrate composed of an intermetallic III-V compound of gallium and interposing between said flat surfaces a liquid layer of gallium in which aluminum has been dissolved to a concentration of more than 0.5% by weight.

3,993,512

METHOD OF MANUFACTURING AN INTEGRATED CIRCUIT UTILIZING OUTDIFFUSION AND MULTIPLE LAYER EPITAXY

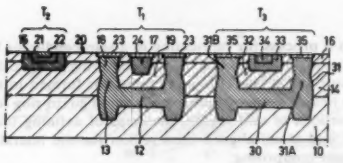
Jean Encinas, Caen, France, assignor to U.S. Philips Corporation, New York, N.Y.

Division of Ser. No. 308,034, Nov. 20, 1972, abandoned. This application Dec. 19, 1974, Ser. No. 534,649

Claims priority, application France, Nov. 22, 1971, 71.41734

Int. Cl.² H01L *21/22*, *21/76*

U.S. Cl. 148—175 14 Claims



1. A method of producing a semiconductor device comprising a plurality of transistors, comprising the steps of:

a. providing a semiconductor substrate defining a first surface region;

b. locally providing at a first portion of said first surface region a first conductivity type impurity to form a first doping region thereat;

c. providing a first epitaxial layer at said first surface region above said first doping region, said first epitaxial layer having a second conductivity type opposite that of said first type, said first layer defining a second surface region;

d. locally providing at a first portion of said second surface region a doping impurity material of said first conductivity type to form a second doping region thereat; said second doping region being laterally disposed with respect to said first doping region;

e. providing a second epitaxial layer of said second conductivity type at the second surface region of said first layer above said second doping region, said second layer comprising a third surface region;

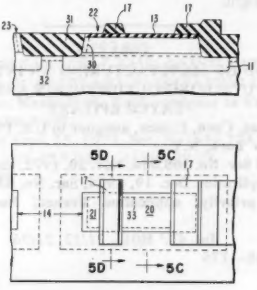
f. diffusing said first conductivity type impurity material from said first and second doping regions into areas closer to the surface of said second epitaxial layer so as to form respective collector zones for first and second ones of said transistors, said first doping region extending further from the surface of said second epitaxial layer that said second doping region; and then

g. forming at said diffused doping regions respective emitter and base zones for said transistors, said base zones having conductivity types opposite to those of said doping regions and said emitter zones having similar conductivity types to said doping regions.

3,993,513
COMBINED METHOD FOR FABRICATING OXIDE-ISOLATED VERTICAL BIPOLAR TRANSISTORS AND COMPLEMENTARY OXIDE-ISOLATED LATERAL BIPOLAR TRANSISTORS AND THE RESULTING STRUCTURES

David O'Brien, Mountain View, Calif., assignor to Fairchild Camera and Instrument Corporation, Mountain View, Calif.

Division of Ser. No. 518,445, Oct. 29, 1974, Pat. No. 3,962,717. This application May 16, 1975, Ser. No. 578,060
Int. Cl.² H01L 21/76, 21/20
U.S. Cl. 148—175 8 Claims



1. In a process for fabricating in a semiconductor body an injection logic semiconductor device having a vertical bipolar transistor and a lateral bipolar transistor formed in a device region in said semiconductor body and a guard ring for selective portions of said region, the steps of defining the device region and a self-aligned base region for the lateral bipolar transistor comprising:

growing a doped epitaxial layer of one conductivity type on a semiconductor substrate;

applying an insulation material over said epitaxial layer;

selectively removing said insulation material and a portion of the underlying epitaxial layer, thereby forming a groove and defining said device region;

applying additional insulation material over a portion of said device region and adjacent portions of said groove, thereby defining the base region of said lateral bipolar transistor;

applying an impurity of opposite conductivity type to exposed portions of said groove to selectively form a guard ring; and

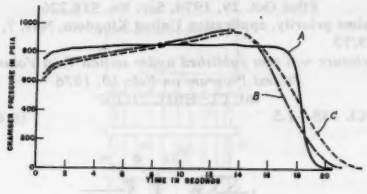
forming an oxide of said semiconductor in said groove to form oxide isolation for said device region.

3,993,514
GAS GENERATING COMPOSITIONS CONTAINING AMMONIUM SULFATE ACCELERATION FORCE DESENSITIZER

Eugene J. Pacanowsky, Elkton, Md., and Eugene A. Martino, Newark, Del., assignors to Thiokol Corporation, Newtown, Pa.

Filed Jan. 27, 1972, Ser. No. 221,169
Int. Cl.³ C06B 45/10
U.S. Cl. 149—19.5 11 Claims

1. A solid combustible gas generating composition having a decreased sensitivity to acceleration forces comprising an intimate mixture of 40% to 70% by weight of finely divided inorganic perchlorate oxidizer, 10% to 35% by weight of an elastomeric combustible binder selected from epoxide cured

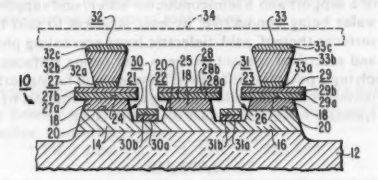


polyester and epoxide cured hydrocarbon polymers and 5 to 35% of an acceleration force desensitizer which is ammonium sulfate.

3,993,515
METHOD OF FORMING RAISED ELECTRICAL CONTACTS ON A SEMICONDUCTOR DEVICE

Walter Francis Reichert, East Brunswick, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Mar. 31, 1975, Ser. No. 563,811
Int. Cl.² H01L 21/443, 21/445
U.S. Cl. 156—3 8 Claims



1. A method of forming raised electrical contacts on a plurality of selected metallized contacts of a semiconductor device including a plurality of mesas disposed on part of a top surface of an insulating substrate, at least some of said metallized contacts being on surfaces of electrically conductive mesas, and at least one of said metallized contacts extending beyond a surface of a mesa in a cantilever manner, said method comprising the steps of:

depositing an electrically continuous layer of a metal over said device including an exposed part of said top surface and in contact with at least portions of said mesas,

applying a photoresist over said device, including metal,

defining openings in said photoresist over areas of said metallized contacts where said raised contacts are to be formed,

electroplating said raised contacts to said areas of said metallized contacts, through said openings, using said metal as an electrode in an electroplating system, and

removing said photoresist and said metal not adjacent to said areas from said device.

3. A method of forming raised electrical contacts as described in claim 1, wherein:

said mesas comprise semiconductor material chosen from the group consisting of germanium, silicon, and a III–V compound,

said semiconductor device comprises a field effect transistor, and

said method further includes the step of defining openings in said metal comprising removing portions of said metal from said areas after the step of defining openings in said photoresist over said areas of said metallized contacts.

3,993,516

METHOD OF CONTROLLED ETCHING IN THE MANUFACTURE OF A COLOR SELECTION MASK FOR A COLOR CATHODE RAY TUBE

Charles J. Prazak,III, Elmhurst, and Raymond M. Stachniak, Chicago, both of Ill., assignors to Zenith Radio Corporation, Chicago, Ill.

Filed Oct. 7, 1974, Ser. No. 512,583
Int. Cl.² H01J *9/20*
U.S. Cl. 156—3 **28 Claims**

9. For use in the manufacture of color selection masks for color television cathode ray tubes, a method of forming a pattern of electron-transmissive apertures of a predetermined size, shape and distribution in a color selection mask, said method comprising:

providing an etchable, electrically conductive blank having a substrate layer on which is disposed an aperture-defining layer;

applying a coating of photoresist material on said aperture-defining layer of said blank;

exposing the photoresist coating in a first preselected illumination pattern with pattern elements corresponding in distribution to the pattern of electron-transmissive apertures to be formed, at least a predetermined group of said pattern of elements being caused to have a smaller size than the desired ultimate mask aperture size;

developing the exposed photoresist;

etching through the blank to form in said aperture-defining layer a preliminary pattern of apertures having, at least in a group of apertures corresponding to said group of pattern elements, a predetermined size which is smaller than a desired ultimate mask aperture size and to form in the substrate layer a pattern of apertures respectively undercutting the apertures in said aperture-defining layer;

exposing the photoresist coating on said aperture-defining layer in a second preselected illumination pattern in which the pattern elements substantially correspond in distribution to the pattern elements of said first illumination pattern, but at least the elements in a predetermined group of which elements substantially correspond in size to said ultimate mask aperture size;

developing the newly exposed areas of the photoresist coating; and

etching through the newly bared portions of said aperture-defining layer resulting from the second exposure and development of the photoresist coating to form a pattern of electron-transmissive apertures in the aperture-defining layer of the blank having the desired ultimate mask aperture size and shape.

3,993,517

THIN CELL ELECTROMEMBRANE SEPARATOR

Burnett M. Schneider, Wind Lake, Wis., assignor to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Oct. 31, 1975, Ser. No. 627,810
Int. Cl.² B01D *13/04;* **C08J** *5/18*
U.S. Cl. 156—13 **11 Claims**

1. A method of manufacturing separators comprising a flow through mesh portion and an integral sealing gasket, said method comprising

a. laying out a mesh sheet,

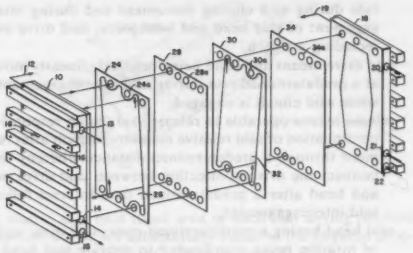
b. placing a master stencil containing a predetermined pattern thereon on top of said mesh sheet,

c. fixing the position of said master stencil with respect to said mesh sheet,

d. pouring a curable polymer through the pattern in said master stencil,

e. spreading the polymer so as to completely fill the pattern,

f. removing said master stencil,



g. pressing the polymer into the mesh, and

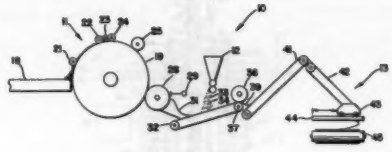
h. curing the polymer.

3,993,518

COTTON BATT AND METHOD FOR PRODUCING SUCH

George Sumner Buck, Jr., 4779 Gwynne Road; Robert George Weyker, 64 S. Mendenhall, both of Memphis, Tenn. 38117, and Arthur Gerhard Ward, 2788 Madison St., Apt. 3, Memphis, Tenn. 38111

Filed Sept. 19, 1974, Ser. No. 507,485
Int. Cl.² B32B *31/00*
U.S. Cl. 156—62.6 **10 Claims**



1. A dry process for producing a cotton batt of high compressive strength comprising the steps of:

I. forming a thin web of cotton fibers;

II. contacting the web with an adhesive amount of particles of a copolymer of vinyl chloride and vinylidene chloride;

III. forming the web into a batt by laying the web transversely back and forth on a moving belt such that the batt comprises a plurality of webs; and then

IV. heating the batt to a temperature above the sticking point of the copolymer but below the scorching point of the cotton wherein the particles have a size range of 20 to 80 microns, wherein the weight ratio of vinyl chloride to vinylidene chloride is 5:95 to 25:75 and wherein the weight ratio of copolymer to the cotton is 10:90 to 20:80.

3,993,519

SPIN WELDING APPARATUS AND METHOD

James A. Birkhold, Troy, Mich., assignor to Olsen Manufacturing Company, Inc., Royal Oak, Mich.

Filed Nov. 7, 1975, Ser. No. 629,848
Int. Cl.² B32B *31/20*
U.S. Cl. 156—73.5 **46 Claims**

1. Apparatus for spin welding together two parts of a workpiece which comprises,

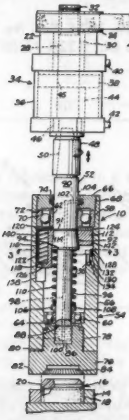
a workpiece holder and a spin head mounted for relative closing movement to interengage said head and one part of a workpiece,

drive means operable to rotate said head at a predetermined rate during said closing movement and during interengagement of said head and workpiece, said drive means including a clutch,

said drive means and head being relatively linearly movable at a predetermined rate during said interengagement and while said clutch is engaged,

release means operable to release said clutch responsive to continuation of said relative linear movement after movement through a predetermined distance whereby to disconnect the drive connection between said drive means and head after a predetermined time interval following said interengagement,

said head having a predetermined mass, said mass and rate of rotation being coordinated to provide said head with rotational inertia adequate to cause said head to continue rotation independently of said drive means for an additional time interval after said disconnection sufficient to complete the spin welding of the workpiece parts.



33. The method of spin welding together two parts of a workpiece which comprises providing a workpiece holder and a spin head rotatable relative thereto through drive means having a drive connection with said head,

utilizing said drive means to rotate said head at a predetermined rate,

while said head is so rotating, engaging said head axially forcibly against one part of the workpiece for spinning the same relative to the other part and thereby initiating the spin welding,

while so spinning said one part, effecting relative linear movement between said drive means and head at a predetermined rate and through a predetermined distance,

after a time interval determined by said rate and distance of linear movement, disconnecting said drive connection and utilizing the rotational inertia of said head to continue rotation thereof independently of said drive means,

and so coordinating said rate of rotation of said head with the mass thereof that said inertia is adequate to sustain said continued rotation for an additional time interval sufficient to complete the spin welding of said parts together.

3,993,520

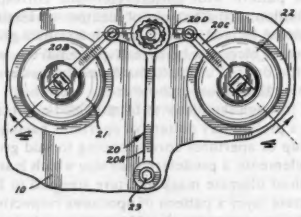
WINDSHIELD REPAIR APPARATUS AND METHOD

Frank D. Werner, and Robert W. Wiele, both of Jackson, Wyo., assignors to Frank D. Werner, Jackson, Wyo.

Continuation of Ser. No. 467,110, May 6, 1974, abandoned. This application Apr. 11, 1975, Ser. No. 567,384

Int. Cl.[2] B32B *35/00*

U.S. Cl. 156—94 **17 Claims**



1. An apparatus for injecting a liquid repair material into a crack of a glass such as a windshield comprising an injector tube, a bridge member of size and shape to hold said injector tube over said crack, means to hold said bridge member in a spaced relationship to said windshield and adjacent said crack, means to mount said injector tube on said bridge member in position to overlie the crack and with an end of said injector tube adjacent portions of said windshield surrounding said crack, said injector tube including means to seal the end of said injector tube against said windshield, and means to force said liquid repair material

12. A method of repairing windshields or the like having cracks therein utilizing a liquid repair material for filling the crack which hardens upon curing comprising the steps of supporting an injector assembly over said crack on a windshield, sealing said injector assembly around the peripheral edges of said crack against uncracked portions of said windshield, placing liquid repair material over said crack, forcing the liquid repair material into said crack without mechanically moving loose portions of said cracked windshield, and creating a vacuum over said crack at a desired level for a cycle time of several minutes, and repeating the steps forcing of liquid repair material into the crack and vacuum cycle to fill the void volume of the crack, including the step of degasifying said liquid repair material prior to forcing the liquid material into the crack, said degasifying step comprising the steps of placing an amount of liquid repair material in a hypodermic syringe having a needle, blocking the outlet of said needle, creating a vacuum within the syringe and simultaneously placing said needle uprightly to let gas bubbles form by the vacuum rise toward the needle, and subsequently expelling the gas bubbles out of the needle.

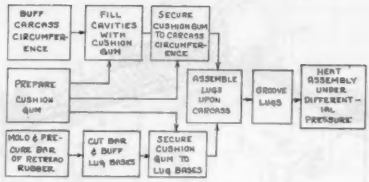
3,993,521
LUGGED VEHICLE TIRE, AND METHOD OF BUILDING SAME

Albert A. Harrelson, Jr., Asheboro, N.C., assignor to Harrelson Rubber Company, Asheboro, N.C.

Division of Ser. No. 509,793, Sept. 27, 1974, Pat. No. 3,945,417, which is a continuation-in-part of Ser. No. 449,917, March 11, 1974, abandoned, which is a continuation-in-part of Ser. No. 366,101, June 1, 1973, abandoned. This application July 23, 1975, Ser. No. 598,358

Int. Cl.² B29H *17/37, 17/40*

U.S. Cl. 156—96 **19 Claims**


BUFF CARCASS CIRCUMFERENCE
FILL CAVITIES WITH CUSHION GUM
SECURE CUSHION GUM TO CARCASS CIRCUMFERENCE
PREPARE CUSHION GUM
ASSEMBLE LUGS UPON CARCASS
GROOVE LUGS
HEAT ASSEMBLY UNDER DIFFERENTIAL PRESSURE
MOLD & PRECURE BAR OF RETREAD RUBBER
CUT BAR & BUFF LUG BASES
SECURE CUSHION GUM TO LUG BASES

1. A method of building a vehicle tire of the lugged type, comprising:

providing a tire carcass having a substantially smooth outer circumference free from major protuberances and cavities;

providing a plurality of lug components of generally rectangular shape, each of said lugs being formed of precured retread rubber material and having substantially uniform strength and density and high cut and abrasion resistance;

assembling upon said outer circumference of said tire carcass said precured lugs and an intervening layer-like mass of uncured and relatively soft cushion gum material having good bonding characteristics, a rapid curing rate, and greater flexibility in both an uncured and a cured condition than said retread rubber material of said lugs; said layer-like mass of cushion gum material underlying said lugs and overlying substantially all of said circumference of said tire carcass and having a minimum thickness of at least approximately ⅜ to ½ inch;

and thereafter heating the assembled cushion gum material, precured lugs and tire carcass while imposing a differential external-internal pressure thereon, within a steam chamber to cure said cushion gum material and permanently bond together all of said components of the assembly.

3,993,522
METHOD OF MAKING ENDLESS POWER TRANSMISSION BELT STRUCTURE

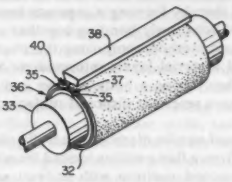
David G. Ballou, Ozark, Mo., assignor to Dayco Corporation, Dayton, Ohio

Division of Ser. No. 492,948, July 30, 1974, Pat. No. 3,930,417. This application Oct. 6, 1975, Ser. No. 620,486

Int. Cl.² B29D *29/00;* **B29H** *7/22;* **B16G** *1/26*

U.S. Cl. 156—137 **1 Claim**

1. A method of making an endless power transmission belt structure comprising the steps of, bonding a plurality of layers of a thermoplastic elastomer together in parallel relation, each of said layers having properties which are different from properties of an adjoining layer, said bonding step comprising extruding a plurality of strips of said thermoplastic elastomer corresponding in number to said plurality of layers, placing said strips face-to-face causing heat fusion thereof and the forming of a strip assembly, wrapping said strip assembly about a building cylinder, heat fusing the ends of said strip assembly together to define a sleeve having a heat fused area, and cooling said sleeve; and completing said endless belt structure using said bonded layers, said completing step comprising cutting said sleeve to define a plurality of endless belt structures wherein each of said belt structures has a heat fused area corresponding to the area of fusion when it comprised



said sleeve, said heat fused area of each belt having physical properties which are substantially equal to the physical properties of the remainder of said belt structure.

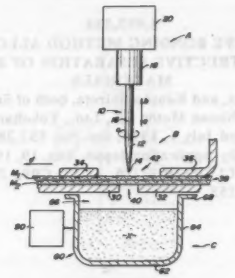
3,993,523
METHOD AND APPARATUS FOR ADHESIVELY JOINING A PLURALITY OF SUPERIMPOSED MATERIAL LAYERS BY A NEEDLING OPERATION

Guilbert M. Hunt; Hugh F. Groth, and Carl E. Bochmann, all of Brecksville, Ohio, assignors to Booz Allen & Hamilton, Inc., Chicago, Ill.

Filed Mar. 10, 1975, Ser. No. 556,790

Int. Cl.² B29C *27/08;* **B32B** *5/06, 31/16*

U.S. Cl. 156—148 **17 Claims**



1. Apparatus for adhesively joining together a plurality of material layers, said apparatus comprising:

an elongated needle member including a body portion and an outer tip and having a longitudional axis, said needle member mounted for reciprocating movement generally longitudinally of said axis and rotational movement about said axis;

an adhesive reservoir containing an adhesive material disposed subjacent of said needle member with said adhesive in said reservoir comprising the only source of adhesive to effect joining between said material layers;

means disposed intermediate said needle member and said reservoir for supporting said material layers;

means for reciprocating said needle member between a first position with said outer tip spaced from said reservoir and a second position piercing said material layers with said outer tip and at least a portion of said body communicating with said adhesive in said reservoir; and,

means for rotating said needle member about said longitudinal axis at high speed at least during movement thereof from said first to said second and from said second to said first positions, the outside surface of that portion of said needle member communicating with said adhesive reservoir in said needle second position being coated with adhesive, that adhesive which comprises the adhesive coating on said needle member being deposited on said

material layers at the area thereof pierced by said needle member through a combination of the rotary and reciprocal movement imparted to said needle member as said needle member is moved from said second to said first position and thereby forming a separate bond zone.

8. A method of adhesively bonding together a plurality of material layers, said method comprising the steps of:

supporting said material layers intermediate an elongated needle member having a body portion and an outer tip and an adhesive reservoir disposed subjacent said needle member;

reciprocating said needle member generally along its longitudinal axis from a first position spaced from asid material layers to a second position with at least said outer tip piercing through said layers;

coating at least said outer end tip with an adhesive material when said needle member is in said second position;

reciprocating said needle member along its longitudinal axis from said second position back toward said first position;

rotating said needle member at high speed about said axis at least during said step of reciprocating said needle member from said first position to said second position and said step of reciprocating said needle member from said second position to said first position; and,

depositing the adhesive coating of said needle member on said material layers at the area thereof pierced by said needle member through a combination of said steps of reciprocating said needle member from said second to said first position and by said step of rotating said needle member and thereby forming a separate bond zone.

3,993,524

ADHESIVE BONDING METHOD ALLOWING NONDESTRUCTIVE SEPARATION OF BONDED MATERIALS

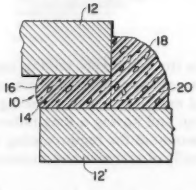
Yasuhiro Okada, and Kensho Shirota, both of Sayama, Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed July 1, 1975, Ser. No. 592,283

Claims priority, application Japan, Aug. 19, 1974, 49-94727

Int. Cl.² B32B *31/26, 31/12;* **C09J** *3/14*

U.S. Cl. 156—155 **6 Claims**



1. A method of bonding a member of an incombustible material with another member of an incombustible material and disassembling the bonded members after completion of bonding, the method comprising the steps of:

preparing an adhesive mixture of an organic polymer base adhesive and an oxidizer, the amount of said oxidizer being such that said adhesive mixture is combustible in the presence of no external oxygen;

forming a layer of said adhesive mixture sandwiched between the two members thereby to bond the two members with each other;

heating said layer to a temperature at which said adhesive mixture ignites;

leaving said layer to burn self-supportedly until said layer burns up and vanishes for non-destructive disassembly and recovery of said members.

3,993,525

METHOD OF MANUFACTURING A BALL-AND-SOCKET JOINT PARTICULARLY FOR DUCTS

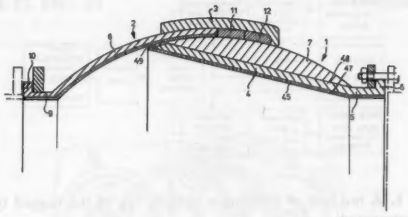
Cornelis van der Jagt, Hoornaar, Netherlands, assignor to Seaking Engineering, Sen AG, Zug, Switzerland

Continuation-in-part of Ser. No. 441,428, Feb. 11, 1974, abandoned. This application Nov. 6, 1975, Ser. No. 629,585

Claims priority, application Netherlands, Feb. 9, 1973, 7301826

Int. Cl.² B31C *13/00;* **F16L** *25/00*

U.S. Cl. 156—170 **16 Claims**



1. A method of manufacturing a pipeline ball-and-socket joint wherein a first coupling portion with a frustoconical inner wall and a spherical-segment outer wall is at least partially surrounded by a second coupling portion with a spherical-segment wall, and the two coupling portions are locked together by means of a lock ring, said method comprising the following steps:

making said first and second coupling portions separately by winding layers of crossing, continuous, resin-coated filaments around respective jig means having external dimensions such as to provide a said first coupling portion having a short cylindrical inner wall succeeded by an outwardly flaring frustoconical inner wall and to provide a said second coupling portion with a short cylindrical wall succeeded by a widening spherical-segment wall terminating at its widest extend just before the spherical segment would begin to curve inwardly, said filaments for each said coupling portion being wound at an acute angle to the longitudinal axis of each coupling portion concerned,

surrounding said frustoconical inner wall of said first coupling portion with an annular filling body the outer surface of which is a spherical segment matching the inner surface of the spherical-segment wall of said second coupling portion,

placing said first coupling portion inside said second coupling portion with their respective spherical-segment surfaces in partial engagement,

placing at least one wide rubber ring around a non-engaging portion of said filling body of said first coupling portion and in abutment with the end of said second coupling portion, the thickness of said ring being substantially equal to the thickness of the spherical-segment wall of said second coupling portion,

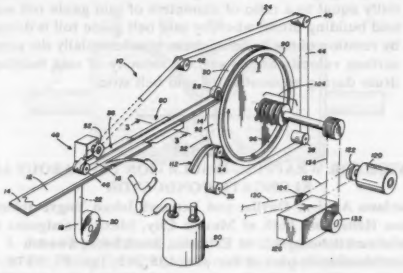
forming said lock ring by winding resin-coated filaments around said rubber ring and an adjacent part of said spherical wall of said second coupling portion while shaping said lock ring as a generally L-shaped section having a short radially extending portion along the edge of the rubber ring more remote from said second coupling member and transversely to the outer surface of said filling body and a longer portion extending in a curve along the outer periphery of said rubber ring and the adjacent part of said spherical-segment wall of said second coupling member.

3,993,526

METHOD OF AND APPARATUS FOR MAKING BONDED BELT LOOPS

Joseph W. A. Off, and Darrel J. Wilbanks, both of Irving, Tex., assignors to Haggar Company, Dallas, Tex.

Division of Ser. No. 395,227, Sept. 7, 1973, Pat. No. 3,880,697. This application Dec. 2, 1974, Ser. No. 528,943
Int. Cl.² B32B 3/04
U.S. Cl. 156—202 4 Claims



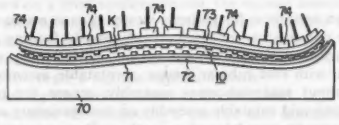
1. A method of making bonded belt loops which comprises:
providing a strip of interfacing material having a thermally responsive layer formed on one side thereof;
engaging the reverse side of a strip of belt loop material with the side of the strip of interfacing material opposite from the adhesive layer;
folding the opposite edges of the strip of belt loop material around the strip of interfacing material;
heating the adhesive layer of the strip of interfacing material sufficiently to effect activation thereof;
pressing the opposed edges of the strip of belt loop material into engagement with the activated adhesive layer and thereby permanently bonding the strip of belt loop material to the strip of interfacing material;
said heating and pressing steps being carried out simultaneously by passing the strip of interfacing material having a belt loop material folded therearound between the periphery of a revolving heated drum and an endless belt traveling around a course including a portion coincident with the periphery of the drum; and
transporting both the strip of interfacing material and the strip of belt loop material on said endless belt through the folding step, and around the revolving heated drum.

3,993,527

METHOD FOR PRODUCING SKI OR OTHER CURVED ARTICLES WITH RESILIENT MOLD

Mitsuharu Ohta, Hamakita, Japan, assignor to Nippon Gakki Seizo Kabushiki Kaisha, Japan

Continuation of Ser. No. 351,833, April 17, 1973, abandoned. This application Apr. 9, 1975, Ser. No. 566,407
Int. Cl.² B30B 9/22, 9/38
U.S. Cl. 156—245 5 Claims



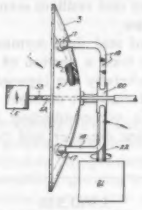
1. A method for forming an article having a desired curvature, which comprises preparing a resilient mold including an upper mold portion and a lower mold portion, each of said upper and lower mold portions comprising resilient metallic plates, said resilient metallic plates being planar and capable of returning to their original shape after being deformed, said resilient mold including a cavity of a shape substantially conforming to the plan contour of said article to be formed, said cavity being defined by block means arranged on said resilient metallic plates so as to form said resilient mold for retaining members constituting said article to be formed therein, disposing said members constituting said article to be formed into said cavity of said resilient mold with an adhesive interposed between said members, said members having the plan contour of the article to be formed but not the final curvature thereof, disposing said resilient mold including said members on a molding surface of a rigid base mold, said molding surface corresponding in shape to the curvature required in said article and subjecting said resilient mold containing said members within said cavity to pressure directed to said molding surface of said base mold, while simultaneously applying heat thereto, so that said resilient mold and said members therein are bent to confrom to the curvature of said molding surface of said base mold, and further whereby said resilient metallic plates return to their initial planar configuration upon the release of said pressure applied to said resilient mold.

3,993,528

METHOD OF CONSTRUCTING SOLAR FURNACE

Lou A. Pauly, 3598 Crocker Road, Eugene, Oreg. 97407

Division of Ser. No. 458,599, April 8, 1974, abandoned. This application June 25, 1975, Ser. No. 590,129
Int. Cl.² B29G 7/02; F24J 3/02
U.S. Cl. 156—245 4 Claims



1. The method of constructing a dish-shaped solar furnace for reflecting solar rays toward a heat exchanger, the method comprising the following steps,
placement of a multitude of mirror elements in rows on a horizontal supporting surface in a mutually spaced apart manner with their coated surfaces uppermost,
superimposing a fiber glass cloth over the uppermost surfaces of the mirror elements,
depositing a discrete quantity of an adhesive agent on the fiber glass cloth above each of said mirror elements therebelow to form a bond between those areas of the cloth receiving a discrete quantity of adhesive agent and the uppermost surface of a subjacent mirror element,
removal of the fiber glass cloth and attached mirror elements from the horizontal supporting surface,
shaping of the cloth and subjacently attached mirror elements about a convex mold surface having a shape corresponding to the desired curvature of the dish-shaped solar furnace with the spaced apart mirror elements independently adjusting into tangential supported contact with the mold surface, and
subsequently applying additional resin and reinforcing fiber glass material to the outer surface of the cloth until a desired thickness is achieved to provide the rigidity desired.

3,993,529

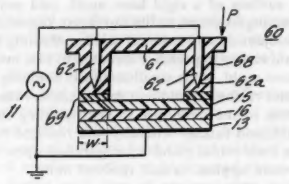
APPARATUS FOR TREATING PLASTIC LOADS

Robert D. Farkas, 772 Prospect St., Westfield, N.J. 07092

Division of Ser. No. 206,363, Dec. 9, 1971, Pat. No. 3,791,906, which is a continuation-in-part of Ser. No. 112,692, Feb. 4, 1971, Pat. No. 3,713,422. This application Nov. 8, 1973, Ser. No. 413,963

Int. Cl.² B32B *19/02*; B23K *13/02*

U.S. Cl. 156—380 13 Claims



1. Apparatus for use in dielectric heating equipment comprising a pair of electrodes and a high frequency generator coupled thereto, said apparatus comprising:

a resilient compressible non-metallic die face member having a first face joined to one of said electrode;

a selected portion of the opposing second face of said resilient member forming a sealing surface of a predetermined contour;

a rigid member imbedded in said resilient member, said rigid member having a tapered outer edge positioned adjacent to and beneath the sealing surface of said resilient member when said resilient member is in the normal uncompressed state;

at least a portion of said rigid member having a contour conforming to at least a portion of the contour of said sealing surface whereby the tapered edge becomes exposed when said resilient member is sufficiently compressed against a non-conductive load positioned between said resilient member and the remaining one of said electrodes.

3,993,530

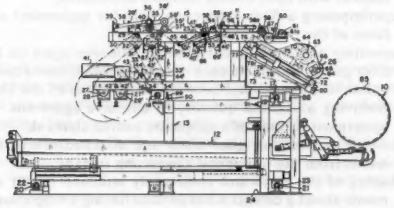
APPARATUS FOR APPLYING BELT STRIPS TO A TIRE CARCASS

Virgil E. Henley, Akron; Frank R. Jellison, Canton, and Robert L. Brown, Akron, all of Ohio, assignors to The General Tire & Rubber Company, Akron, Ohio

Continuation-in-part of Ser. No. 406,984, Oct. 16, 1973, abandoned. This application June 9, 1975, Ser. No. 585,263

Int. Cl.² B29H *17/20*

U.S. Cl. 156—405 10 Claims



1. Service apparatus for applying belt strips onto a rotatable tire building drum comprising:

belt guide means having at least one belt guide roll for guiding a belt strip over the building drum in precision alignment relative to the circumferential centerline of the building drum, said belt guide roll defining a belt strip receiving groove with a width corresponding to the width of said belt strip, said belt strip being wrapped around a portion of said belt guide roll in said groove; and

a first drive ring coaxial with and fastened to rotate with a belt guide roll of said guide means, and a second drive ring coaxial with and fastened to rotate with said building drum and engage said first drive ring in frictional rolling engagement with circumferential portions of said first drive ring, said first and second drive rings being selectively engageable and having a ratio of diameters substantially equal to a ratio of diameters of said guide roll and said building drum, whereby said belt guide roll is driven by rotation of the building drum at substantially the same surface velocity as the surface velocity of said building drum during application of said belt strip.

3,993,531

DEVICE FOR WRAPPING INSULATION TAPE ABOUT AN ELONGATE CONDUCTOR

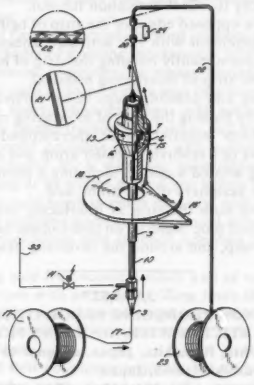
Octaviano Aguirre Dávila, and Lennart Johan Yngve Johansson Hellström, both of Mexico City, Mexico, assignors to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden

Continuation-in-part of Ser. No. 435,242, Jan. 21, 1974, abandoned. This application Oct. 23, 1975, Ser. No. 625,255

Claims priority, application Mexico, Jan. 19, 1973, 141037

Int. Cl.² H01B *13/26*; B65H *81/06*

U.S. Cl. 156—428 15 Claims

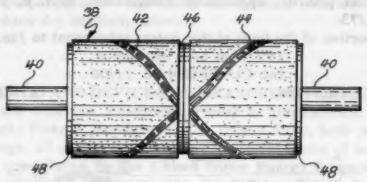


1. An apparatus for gluing a wrapping tape on an elongate article comprising: means for continuously feeding an elongate article through tubular means; a stationary assembly coaxial with said tubular means; a rotatable assembly rotatable about said stationary assembly; means for rotatably mounting said rotatable assembly on said stationary assembly; and means for supplying glue or other adhesive to said stationary assembly, said stationary assembly having means for feeding the adhesive to said rotatable assembly, said rotatable assembly having means for receiving the adhesive from said stationary means and having means for coating a strip of the adhesive onto a portion of a wrapping tape and rotatable means for wrapping the coated tape onto said elongate article.

3,993,532
ULTRASONIC SEALING PATTERN ROLL

James L. McDonald, and Christian Toussieux, both of Charlotte, N.C., assignors to Consolidated Engravers Corporation, Charlotte, N.C.

Filed Nov. 11, 1974, Ser. No. 522,785
Int. Cl.² B32B 31/00; B21B 27/02; B23K 1/06
U.S. Cl. 156—580 4 Claims

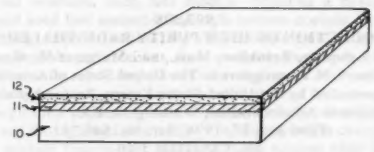


1. An improved pattern roll for use in opposition to a sonic horn for fusing heat responsive material interposed between said roll and horn, said pattern roll comprising a cylindrical body having discrete horn opposing elements projecting from a continuous base rib raised at the surface of said body, said elements and base rib being integral with said body and following a predetermined and independently selected pattern as to course of said base rib and cross-sectional shape and spacing of said elements, said horn opposing elements are finished at an even projecting height and with a projecting face curvature concentric with the roll axis.

3,993,533
METHOD FOR MAKING SEMICONDUCTORS FOR SOLAR CELLS

Arthur G. Milnes, Pittsburgh, and Donald L. Feucht, Wilkins Township, Allegheny County, both of Pa., assignors to Carnegie-Mellon University, Pittsburgh, Pa.

Filed Apr. 9, 1975, Ser. No. 566,308
Int. Cl.² B01J 17/00, 17/30
U.S. Cl. 156—613 26 Claims



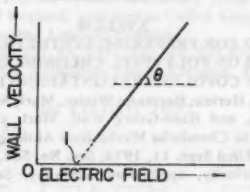
1. A method for producing a desired thin semiconductor film for use in solar cells comprising:
a. growing epitaxially the desired semiconductor film on a second semiconductor film which has been epitaxially grown on a third semiconductor, the second semiconductor film having a lower melting point than the desired semiconductor film and the third semiconductor;
b. increasing the temperature of the second semiconductor film to create a molten state; and then
c. detaching the desired semiconductor film.

20. A method for producing a desired thin semiconductor film for use in solar cells comprising:
a. growing epitaxially the desired semiconductor film on a second semiconductor film which has been epitaxially grown on a third semiconductor film, the second semiconductor having greater solubility in a chemical agent than the desired semiconductor film and the third semiconductor;
b. immersing the films in a chemical agent to dissolve the second semiconductor film; and then
c. detaching the desired semiconductor film.

3,993,534
METHOD OF PRODUCING SINGLE CRYSTALS OF GADOLINIUM MOLYBDATE FAMILY

Kazuyuki Nagatuma, Hachioji; Seikichi Akiyama, Kokubunji; Hirotugu Kozuka, Tokyo, and Masayoshi Kobayashi, Hachioji, all of Japan, assignors to Hitachi, Ltd., Japan

Division of Ser. No. 440,359, Feb. 7, 1974, Pat. No. 3,894,846.
This application Jan. 3, 1975, Ser. No. 538,336
Claims priority, application Japan, Feb. 7, 1973, 48-14651; Oct. 31, 1973, 48-121671
Int. Cl.² B01D 9/00; C01G 39/00, 57/00
U.S. Cl. 156—617 SP 5 Claims



1. A method for producing a single crystal selected from the group consisting of gadolinium molybdate, samarium molybdate, europium molybdate, dysprosium molybdate and terbium molybdate comprising growing a single crystal from a melt having a chemical composition corresponding to the chemical composition of said crystal by a crystal pulling technique, cooling said single crystal in accordance with an exponential function, maintaining said cooled single crystal at a temperature immediately below the melting point of said single crystal for a time and temperature within the area B of FIG. 13 of the drawings, cooling said single crystal at a cooling rate less than 250° C/hr. in the temperature range of from immediately below the melting point of said single crystal to the β-α transition temperature of said single crystal, and cooling said single crystal at a cooling rate of about 250 to 1,100° C/hr. in the temperature range below the β-α transition temperature of said single crystal.

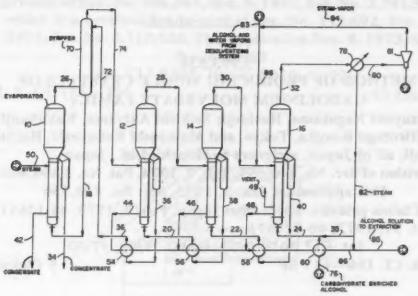
3,993,535
MULTIPLE EFFECT EVAPORATION PROCESS

George B. Karnofsky, Pittsburgh, Pa., assignor to Dravo Corporation, Pittsburgh, Pa.

Filed Oct. 30, 1974, Ser. No. 519,228
Int. Cl.² B01D 1/26, 1/00; A23L 1/10
U.S. Cl. 159—47 R 17 Claims

1. In a process for treating by multiple-effect evaporation system an aqueous organic solution including organic solutes obtained from a process for extracting a solids material with an aqueous solution of a volatile organic solvent wherein said aqueous solution of a volatile organic solvent is recovered by multiple-effect evaporation while simultaneous removing the organic solutes with the undistilled bottoms, including water substantially free of said organic solvent, the improvement

comprising countercurrently contacting vapor withdrawn from the last effect of said multiple effect evaporation system



counting in the direction of liquid flow with a liquid stream to be introduced into said last effect.

3,993,536

METHOD FOR PREPARING SYNTHETIC POWDERS BASED ON POLYVINYL CHLORIDE OR VINYL CHLORIDE COPOLYMERS CONTAINING EMULSIFIERS

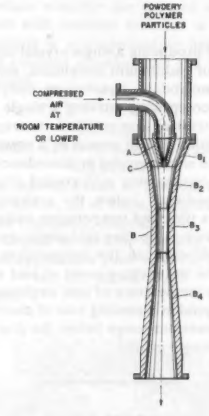
Josef Kalka, Herten; Hermann Winter, Marl; Manfred Smolinski, Marl, and Hans-Georg Wolf, Marl, all of Germany, assignors to Chemische Werke Huls Aktiengesellschaft

Filed Sept. 11, 1974, Ser. No. 505,045

Claims priority, application Germany, Sept. 14, 1973, 2346274

Int. Cl.² B01D *1/16*

U.S. Cl. 159—48 R **5 Claims**



1. An apparatus for treating finely divided powdery vinyl chloride polymer particles, comprising:

A. a converging driving nozzle having an orifice diameter of 5 to 50 mm; and

B. a diffuser surrounding said driving nozzle having;

a. a first converging conical section with a negative slope of 20°;

b. a second converging conical section extending from said first conical section having a negative slope of 7°42′;

c. a straight cylindrical section extending from said second conical section having an aperture diameter of 10 to 80 mm; and

d. a third conical section extending from said cylindrical section having a positive diverging slope of 3°49′ and a terminal aperture diameter of 50 to 200 mm.

3,993,537

METHOD OF REGULATING A PAPER MACHINE

Peter Biornstad, Ravensburg, Germany, assignor to Escher Wyss G.m.b.H., Ravensburg, Germany

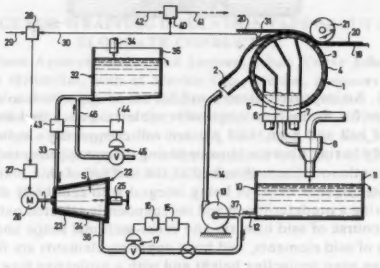
Filed Aug. 23, 1974, Ser. No. 500,105

Claims priority, application Switzerland, Sept. 6, 1973, 12801/73

The portion of the term of this patent subsequent to Jan. 27, 1993, has been disclaimed.

Int. Cl.² D21F *1/06, 11/00*

U.S. Cl. 162—198 **11 Claims**



1. In a method of regulating a paper machine having a breast box the steps of

grinding a stock in a refiner;

thereafter supplying the stock to the breast stock at a constant throughflow quantity as a function of time and at a constant concentration;

measuring the pressure at the breast box as a measure of the dehydration capacity of the stock expelled from the breast box to obtain a measurement signal for regulation of the paper machine; and

supplying said signal to the refiner to vary said grinding of the stock.

3,993,538

PRODUCTION OF HIGH PURITY RADIOTHALLIUM

Elliot Lebowitz, Brookline, Mass., and Margaret W. Greene, Bellport, N.Y., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Jan. 27, 1976, Ser. No. 646,781

Int. Cl.² G21G *1/10*

U.S. Cl. 176—11 **4 Claims**

1. A method of producing at least 99% purity and high specific activity thallium-201 in its thallous form suitable for radiopharmaceutical applications comprising the steps of:

a. irradiating a thallium target of at least 99.9% purity containing thallium-203 with a beam of protons in the range of 20-30 MeV and whose thickness is sufficiently great so that said beam is attenuated to a level not below 20 MeV for a sufficient length of time to produce lead-201 by the reaction $^{203}Tl(p,3n)\ ^{201}Pb$;

b. dissolving the irradiated target;

c. reducing any thallium present in the thallic form to its thallous state;

d. subjecting the resulting solution to cation exchange to remove the thallium present and produce an eluate containing largely ^{203}Pb and ^{201}Pb in solution;

e. acidifying the eluate;

f. oxidizing any remaining traces of thallium to a thallic complex;

g. subjecting the oxidized solution to anion exchange to remove the complexed thallium;
h. permitting the mixture of lead 201 and 203 in the eluate to decay for no longer than about 24 hours to produce thallium-201 in substantial amounts and thallium-203 in insignificant amounts;
i. subjecting the decayed solution to another anion exchange wherein the thallium-201 is deposited out;
j. eluting the deposited ^{201}Tl by converting any thallium in thallic form to its thallous form; and
k. preparing and evaporating the thallium solution to produce dry thallium chloride.

3,993,539

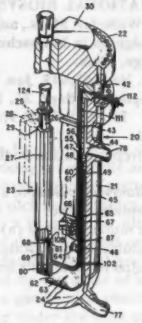
METHOD AND DEVICE FOR MEASURING FLUID FLOW

Richard Atherton, Pittsburgh; Phillip S. Marinkovich, Bethel Park; Peter R. Spadaro, and J. Wilson Stout, both of Pittsburgh, all of Pa., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Division of Ser. No. 461,474, April 16, 1974, abandoned. This application Aug. 7, 1975, Ser. No. 602,707

Int. Cl.² G21C *17/00*

U.S. Cl. 176—19 R **1 Claim**



1. In a nuclear reactor core comprising a grouped plurality of fuel modules, each fuel module including a hexagonal-shaped seed fuel assembly having a bottom coolant inlet end centrally disposed within the fuel module and an annular, hexagonal-shaped blanket fuel assembly having a bottom coolant inlet end disposed about the seed fuel assembly whereby coolant enters said seed and blanket fuel assemblies through their respective bottom coolant inlet ends and passes upward through said assemblies; the improvement comprising fuel module flow meters disposed at the bottom ends of said fuel modules; each of said flowmeters including:
1. a seed fuel assembly flowmeter portion comprising:
a. a generally cylindrical body defining:
i. a plurality of first axially-extending venturis, each of said first venturis having a rounded inlet, a throat and a divergent section;
ii. a plurality of first pressure taps opening immediately upstream of the inlet to said first venturis, said first pressure taps being commonly manifolded to a first single outlet; and
iii. a plurality of second pressure taps opening within the throat sections of said first venturis, said second pressure taps being commonly manifolded to a second single outlet;
b. means connected to said first and second outlets for determining the pressure differential therebetween;
c. means relating the differential pressure between said first and second outlets to the rate of coolant flow through said seed fuel assembly flowmeter portion;
2. a blanket fuel assembly flowmeter portion comprising:
a. an annular body defining:
i. a plurality of second axially extending venturis, each of said second venturis having a rounded inlet, a throat and a divergent section;
ii. a plurality of third pressure taps opening immediately upstream of the inlets to said second venturis, said third pressure taps being commonly manifolded into a third single outlet;
iii. a plurality of fourth pressure taps opening within the throat sections of said second venturis, said fourth pressure taps being commonly manifolded to a fourth single outlet;
b. means connected to said third and fourth outlets for determining the pressure differential therebetween; and
c. means relating the pressure differential between said third and fourth outlets to the rate of current flow through said blanket fuel assembly flowmeter portion.

3,993,540

HELIUM COOLED NUCLEAR REACTORS

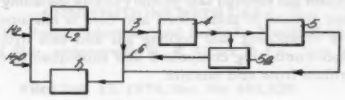
Peter Bryan Longton, Lymm, and Henry Chapman Cowen, Sale, both of England, assignors to United Kingdom Atomic Energy Authority, London, England

Filed Jan. 13, 1975, Ser. No. 540,392

Claims priority, application United Kingdom, Feb. 1, 1974, 4870/74

Int. Cl.² G21C *19/32*

U.S. Cl. 176—37 **8 Claims**



1. A helium cooled, graphite moderated, nuclear reactor having a main coolant gas circuit and a coolant gas purification means, said purification means comprising:
a. oxidizing means for oxidizing impurities in the coolant gas;
b. means for conveying a fraction of the main coolant stream to said oxidizing means to convert hydrogen and carbon monoxide present in said gas to water and carbon dioxide;
c. means for removing carbon dioxide from at least a portion of the gas leaving said oxidizing means;
d. means for conveying at least a portion of the gas leaving said oxidizing means to said carbon dioxide removing means to remove carbon dioxide therefrom;
e. means for conveying at least a portion of the gas leaving said carbon dioxide removing means to said main coolant circuit; and
f. means for conveying at least a portion of the gas leaving said oxidizing means to said main coolant circuit to introduce water-containing coolant gas thereto.

3,993,541

REMOVAL OF TRITIUM FROM GAS-COOLED NUCLEAR REACTORS

Rudolf Nieder, Julich-Barmen, Germany, assignor to Arbeitsgemeinschaft Versuchsreaktor Avr GmbH, Dusseldorf, Germany

Filed July 25, 1973, Ser. No. 382,556

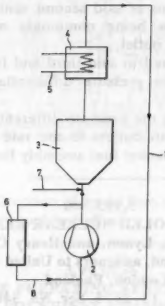
Claims priority, application Germany, July 31, 1972, 2237506

Int. Cl.² G21C *9/00, 19/32*

U.S. Cl. 176—37 **14 Claims**

1. In a method of operating a gas-cooled nuclear reactor having a core in which the heavy hydrogen isotope tritium is

present as a radioactive contaminant, the reactor including a primary circuit for circulating a coolant gas through the core, said method including the step of cooling said core by circulating the coolant gas through the primary circuit including the core of said reactor, the improvement comprising removing tritium from said coolant gas in said primary circuit by the steps of introducing hydrogen or a hydrogen-containing compound into said coolant gas in said primary circuit and flowing the hydrogen or a hydrogen containing compound mixed with the coolant gas through said primary circuit including the core whereby tritium in said circuit and core is entrained in the mixture comprising said cooling gas and said hydrogen or hydrogen-containing compound and subsequently removing said tritium from said mixture.



3,993,542

PROCESS AND APPARATUS FOR EXTRACTION OF GASES PRODUCED DURING OPERATION OF A FUSED-SALT NUCLEAR REACTOR

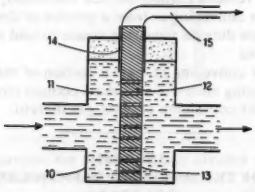
Jacques Blum, Levallois, and Jacques Maire, Epinay sur Seine, both of France, assignors to Pechiney Ugine Kuhlmann and Le Carbone Lorraine, both of Paris, France

Filed Feb. 6, 1975, Ser. No. 547,659

Claims priority, application France, Feb. 28, 1974, 74.06755

Int. Cl.³ G21C *9/00*; G21F *9/04*

U.S. Cl. 176—37 **10 Claims**



1. A process for the extraction of gases produced during the operation of a fused-salt nuclear reactor comprising placement of a material which is gas permeable and fused-salt impermeable in the fused-salt circuit of the reactor so that one part of its surface is in contact with the salt mixture to be degased, applying suction to another part of its surface and carrying the gas to a collection system.

3,993,543

PROCESS FOR PRODUCING PYRUVIC ACID BY FERMENTATION

Ryosuke Uchio, Zushi; Kenji Kikuchi, Kawasaki; Hitoshi Enei, Zushi, and Yoshio Hirose, Fujisawa, all of Japan, assignors to Ajinomoto Co., Inc., Tokyo, Japan

Filed July 7, 1975, Ser. No. 593,291

Claims priority, application Japan, July 8, 1974, 49-77960

Int. Cl.² C12D *13/06*

U.S. Cl. 195—29 **5 Claims**

1. A process for producing pyruvic acid by fermentation in an aqueous nutrient medium of a pyruvic acid producing mutant of the strain *Candida lipolytica* which requires methionine and thiamine for growth to accumulate pyruvic acid in the culture liquor, and recovering the pyruvic acid.

3,993,544

DERIVATIVES OF STREPTOMYCIN AND METHOD OF PRODUCING STREPTOMYCIN DERIVATIVES BY MUTATIONAL BIOSYNTHESIS

Arnold L. Demain, Wellesley, Mass., and Kozo Nagaoka, Yokohama, Japan, assignors to Massachusetts Institute of Technology, Cambridge, Mass.

Division of Ser. No. 542,645, Jan. 20, 1975, Pat. No. 3,956,275. This application Sept. 26, 1975, Ser. No. 616,938

Int. Cl.² C12D *9/00*

U.S. Cl. 195—80 R **5 Claims**

1. A method of preparing a streptidine analogue of streptomycin comprising:

a. mutating *Streptomyces griseus* to a state of dependency on exogenous streptidine; and,

b. cultivating the mutant of step (a) in an aqueous medium containing a soluble carbohydrate, a source of assimilable nitrogen, essential mineral salts and an added analogue of streptidine.

3,993,545

ANTIBIOTIC X-1092

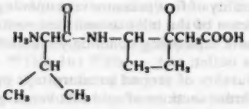
David Pruess, and James Parnell Scannell, both of North Caldwell, N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 504,598, Sept. 9, 1974, Pat. No. 3,939,139. This application Nov. 10, 1975, Ser. No. 630,243

Int. Cl.² C12D *9/00*

U.S. Cl. 195—80 R **1 Claim**

1. The process for the production of an antibiotic substance of the formula



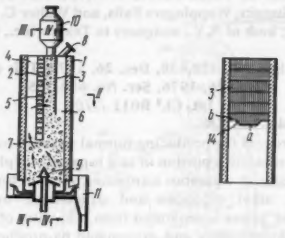
which comprises cultivating a strain of Streptomyces sp. X-1092 deposited as NRRL 8047 in an aqueous carbohydrate solution containing a nitrogenous nutrient under submerged earobic conditions until activity versus Gram-positive bacteria is imparted to said solution and then recovering said antibiotic of the formula I from said solution.

3,993,546

SHAFT FURNACE FOR THERMOLYTIC DISTILLATION OF HYDROCARBON FUEL

Nikolai Andreevich Nazinin, ulitsa Vyidu, 12, kv. 30; Leonid Semenovich Ananiev, ulitsa Komsomoli, 15, kv. 12; Ivar Kharaldovich Roox, ulitsa Komsomoli, 27, kv. 24, and Viktor Mikhailovich Efimov, ulitsa Vyidu, 4, kv. 5, all of Estonskaya SSR, Kokhtla-Yarve, U.S.S.R.

Filed May 2, 1975, Ser. No. 573,998
Int. Cl.² C10B 3/00; F27D 5/00
U.S. Cl. 202—99 6 Claims



1. In a shaft furnace for thermolytic distillation of solid hydrocarbon fuel comprising: a vertically disposed, cylindrical casing; at least two vertically disposed gratings provided in the upper part of said casing such that the sides of said gratings are attached to said casing; a heat carrier distributing chamber formed by a side wall of the casing and one of said gratings; a semi-coking chamber formed by said gratings; a vapour-gas mixture chamber formed by the other of said gratings and a side wall of the casing; a gasification chamber located in the lower part of said casing under the heat carrier distributing, semi-coking and vapour-gas mixture chambers and communicating with said chambers; means for admitting heating gas into said heat carrier distributing chamber; means for discharging the vapour-gas mixture from said vapour-gas mixture chamber; means for feeding solid fuel into the upper part of said semi-coking chamber; and means for discharging solid semi-coked waste from the lower part of the gasification chamber; the improvement comprising: wherein the lowermost edge of at least one of said gratings is provided with opposing cutouts adjacent the sides of the casing, whereby the resulting dependent, central section in conjuction with the cutouts of said at least one of said gratings constitutes means for more evenly distributing the solid fuel in the gasification chamber and for more uniformly distilling the solid fuel.

3,993,547

ALPHA, GAMMA-BIS-DIPHENYLENE-BETA-PHENYL ALLYL AS A POLYMERIZATION INHIBITOR FOR VINYL AROMATIC COMPOUNDS

James M. Watson, Big Spring, Tex., assignor to Cosden Technology, Inc., Big Spring, Tex.

Filed Jan. 24, 1975, Ser. No. 542,976
Int. Cl.² C07C 7/18
U.S. Cl. 203—9 5 Claims

1. A process for the distillation of a readily polymerizable vinyl aromatic compound, which comprises subjecting said compound to distillation conditions in a distillation system and adding to said system a polymerization inhibitor comprising an alpha, gamma-bis-diphenylene-beta-phenyl allyl.

3,993,548

ZINC ELECTRODEPOSITION PROCESS AND BATH FOR USE THEREIN

Hans Gerhard Creutz, Yale, and John B. Capuano, Warren, both of Mich., assignors to Oxy Metal Industries Corporation, Warren, Mich.

Filed May 21, 1975, Ser. No. 579,529
Int. Cl.² C25D 3/22, 3/24
U.S. Cl. 204—55 R 5 Claims

1. In a method of electrodepositing zinc from an aqueous alkaline plating bath, the improvement of incorporating into said bath at least one water soluble, chelating and grain refining agent which also serves as a brightener, said agent having the structure:

$$ROR' : xSiO_2 : yH_2O$$

where R is a quaternary ammonium radical substituted with four organic groups selected from the groups consisting of alkyl, alkylene, alkanol, aryl and alkylaryl, where R' is the same as R or hydrogen, where x equals 1 to 3, and where y equals 0 to 15, and said agent being present in an amount ranging from about 0.01 to about 100 grams per liter.

3,993,549

CURABLE SOLID ADDUCTS OF POLYENE-POLYTHIOL COMPOSITIONS WITH UREA

Richard W. Bush, Columbia, and Louis L. Wood, Rockville, both of Md., assignors to W. R. Grace & Co., New York, N.Y.

Filed July 12, 1974, Ser. No. 487,938
Int. Cl.² C08F 2/46, 8/18
U.S. Cl. 204—159.22 9 Claims

1. A solid radiation curable composition capable of forming, upon curing, a crosslinked, three dimensional network comprising (1) a particulate urea having a mesh size of no greater than 10 microns in an amount ranging from 10–70 weight percent of the composition, and a liquid mixture of (2) a polyene containing at least two unsaturated carbon to carbon bonds per molecule and (3) a polythiol containing at least two thiol groups per molecule, the total combined functionality of the unsaturated carbon to carbon bonds per molecule in the polyene and the thiol groups per molecule in the polythiol being greater than 4, and the combined polyene and polythiol containing at least 20 percent by weight of oxyethylene units.

3,993,550

PHOTOCHLORINATION OF ALKANOLS

Norman C. Deno, State College, Pa., and Harry J. Spinelli, Newark, Del., assignors to Research Corporation, New York, N.Y.

Filed Feb. 18, 1975, Ser. No. 550,744
Disclosure was also published under second Trial Voluntary Protest Program on Feb. 17, 1976
Int. Cl.² B01J 1/10
U.S. Cl. 204—158 HA 23 Claims

1. A method for the photochlorination of an alkanol which comprises reacting a C_4 or higher alkanol in a liquid aqueous buffered solvent at a pH in the range from about 4 to about 9 with chlorine in the substantial absence of oxygen while irradiating the resulting reaction mixture.

3,993,551

PROCESS FOR COCROSSLINKING WATER SOLUBLE POLYMERS AND PRODUCTS THEREOF

Per G. Assarsson, Montclair, N.J., and Paul A. King, Warwick, N.Y., assignors to Union Carbide Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 395,553, Sept. 10, 1973, Pat. No. 3,893,143, which is a continuation of Ser. No. 152,370, June 11, 1971, abandoned. This application June 30, 1975, Ser. No. 592,130

Int. Cl.² C08F *8/00;* C08D *1/00*

U.S. Cl. 204—159.14 8 Claims

1. A process for cocrosslinking at least two water soluble polymers one of which is poly(ethylene oxide) and the other is a second polymer selected from the group consisting of polyacrylic acid, ammonium polyacrylate, vinylmethyl ether-maleic anhydride copolymer and ethylene-maleic anhydride copolymer said process comprising the steps of:

a. forming an aqueous solution comprising up to 50 per cent by weight of poly(ethylene oxide) and said second polymer,

b. adjusting the pH of said solution to within the range of from about 2 to about 11,

c. intimately mixing said solution to form a homogeneous or heterogeneous micro-phase system, and

d. before any substantial phase separation, exposing said solution to ionizing radiation of a sufficient dosage and for a period of time to form a gel.

3,993,552

PROCESS FOR COCROSSLINKING WATER SOLUBLE POLYMERS AND PRODUCTS THEREOF

Per G. Assarsson, Montclair, N.J., and Paul A. King, Warwick, N.Y., assignors to Union Carbide Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 395,553, Sept. 10, 1973, Pat. No. 3,898,143, which is a continuation of Ser. No. 152,370, June 11, 1971, abandoned. This application June 30, 1975, Ser. No. 592,093

Int. Cl.² C08D *1/00;* C08F *1/16*

U.S. Cl. 204—159.12 8 Claims

1. A process for cocrosslinking at least two water soluble polymers one of which is poly(ethylene oxide) and the other is gelatin, said process comprising the steps of:

a. forming an aqueous solution comprising up to 50 percent by weight of poly(ethylene oxide) and gelatin,

b. adjusting the pH of said solution to within the range of from about 2 to about 11,

c. intimately mixing said solution to form a homogeneous or heterogeneous micro-phase system, and

d. before any substantial phase separation, exposing said solution to ionizing radiation of a sufficient dosage and for a period of time to form a gel.

3,993,553

PROCESS FOR COCROSSLINKING WATER SOLUBLE POLYMERS AND PRODUCTS THEREOF

Per G. Assarsson, Montclair, N.J., and Paul A. King, Warwick, N.Y., assignors to Union Carbide Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 395,553, Sept. 10, 1973, Pat. No. 3,898,143, which is a continuation of Ser. No. 152,370, June 11, 1971, abandoned. This application June 30, 1975, Ser. No. 592,094

Int. Cl.² C08D *1/00;* C08F *1/16*

U.S. Cl. 204—159.12 8 Claims

1. A process for cocrosslinking at least two water soluble polymers one of which is poly(ethylene oxide) and the other is a cellulose derivative selected from the group consisting of: methylcellulose, ethylcellulose, hydroxyethylcellulose, hydroxypropyl-methylcellulose, ethyl-hydroxyethylcellulose, ethyl-methylcellulose, hydroxyethyl-methylcellulose, carboxymethylcellulose and salts thereof, and carboxymethyl-hydroxyethylcellulose salts, said process comprising the steps of:

a. forming an aqueous solution comprising up to 50 percent by weight of poly(ethylene oxide) and a cellulose derivative,

b. adjusting the pH of said solution to within the range of from about 2 to about 11,

c. intimately mixing said solution to form a homogeneous or heterogeneous micro-phase system, and

d. before any substantial phase separation, exposing said solution to ionizing radiation of a sufficient dosage and for a period of time to form a gel.

3,993,554

METHOD OF PRODUCING N-PARAFFIN OXIMES

Robert M. Suggitt, Wappingers Falls, and Walter C. Gates, Jr., Newburg, both of N.Y., assignors to Texaco Inc., New York, N.Y.

Division of Ser. No. 428,638, Dec. 26, 1973. This application Jan. 26, 1976, Ser. No. 652,585

Int. Cl.² B01J *1/10*

U.S. Cl. 204—162 XN 11 Claims

1. In a process for producing normal paraffin oximes from n-paraffins wherein a portion of said n-paraffin is photochemically reacted with a gaseous nitrosating agent to form a paraffin oxime, alkyl chlorides and oxygenated by-products, wherein said oxime is separated from a mixture of unreacted paraffin, alkylchlorides and oxygenated by-products, the improvement which comprises:

a. catalytically hydrogenating said mixture at a temperature of from about 600° to 750° F. in the presence of a catalyst composed of alumina, a Group VIII metal and from about 0.05 to 2.0 weight percent of an alkali metal oxide, alkaline earth metal oxide or thallous oxide; and

b. recycling said hydrogenated product of (a) for reaction with said n-paraffin to said oxime.

3,993,555

METHOD OF SEPARATING BITUMEN FROM TAR SAND WITH COLD SOLVENT

Jack H. Park, Houston, and Joseph C. Allen, Bellaire, both of Tex., assignors to Texaco Inc., New York, N.Y.

Filed May 16, 1975, Ser. No. 578,223

Int. Cl.² C10G *1/04*

U.S. Cl. 208—11 LE 20 Claims

1. A method for extracting bitumen from tar sand wherein a bitumen solvent having a freezing point below the freezing point of any water present in the tar sand is contacted with the tar sand and the dissolved liquid bitumen and solvent mixture is subsequently separated from the sand and water the improvement which comprises

lowering the tar/sand solvent mixture to a temperature sufficient to freeze the water in the tar sand.

3,993,556

METHOD OF CATALYTIC CRACKING OF HYDROCARBONS

David L. Reynolds, Nederland, and Douglas J. Youngblood, Groves, both of Tex., assignors to Texaco Inc., New York, N.Y.

Continuation of Ser. No. 313,714, Dec. 11, 1972, abandoned, which is a continuation of Ser. No. 889,494, Dec. 31, 1969, abandoned. This application Nov. 25, 1974, Ser. No. 526,868

Int. Cl.² B01J *8/24;* C10G *11/04*

U.S. Cl. 208—75 11 Claims

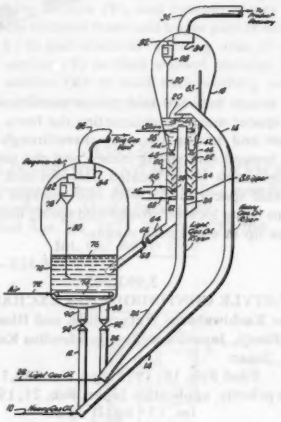
1. In a process for the catalytic cracking of a multiplicity of virgin gas oils with a zeolite cracking catalyst in a fluid catalytic cracking unit comprising a reactor, a regenerator and a multiplicity of elongated reaction zones wherein said reactor contains a dense phase and a dilute phase of said catalyst and said elongated reaction zones terminate at said reactor and wherein admixtures of said gas oil and said catalyst are passed

through said elongated reaction zones under catalytic cracking conditions to said reactor, the improvement which comprises:

a. passing through a first elongated reaction zone a virgin gas oil having a boiling range between 600° and 1050° F.,

b. passing through a second elongated reaction zone a virgin gas oil having a boiling range between 430 and 750° F., said gas oil of step (a) having a higher boiling range than the gas oil of step (b),

c. adjusting the catalytic cracking conditions in said first elongated reaction zone and said second elongated reaction zone to maintain the conversion of said higher boiling gas oil 0–30 volume percent lower than the conversion of said lower boiling gas oil,



d. discharging the effluent from said elongated reaction zones into a catalyst phase in said reactor, said effluent comprising vaporous reaction mixture and catalyst, and

e. recovering from said reactor, as a product therefrom, naphtha having a higher octane rating and at a higher yield than if said lower boiling gas oil and said higher boiling gas oil were combined and catalytically cracked with a zeolite cracking catalyst in an elongated reaction zone at substantially the same overall conversion obtained in said first and second elongated reaction zones.

3,993,557

HYDROCARBON CONVERSION PROCESS EMPLOYING BORIA-ALUMINA COMPOSITIONS

Lloyd A. Pine, 6226 Morgan Road, Greenwell Springs, La. 70739

Division of Ser. No. 455,236, March 27, 1974, Pat. No. 3,954,670. This application Oct. 9, 1975, Ser. No. 620,875

Int. Cl.² C07C *7/18*

U.S. Cl. 208—111 **7 Claims**

1. A hydrocarbon conversion process which comprises contacting a hydrocarbon fluid in a conversion zone at elevated temperatures with a catalyst composition comprising:

a. a metal or compound of a metal selected from the group consisting of rare earth, Group IB, IIA, IIB, IIIB, IVA, IVB, VB, VIB, VIIB and VIII of the Periodic Table and combinations thereof, and

b. a boria-alumina composition prepared by hydrolysis of a mixture of aluminum alkoxide and boron alkoxide in the presence of water.

3,993,558

METHOD OF SEPARATION OF FISSION AND CORROSION PRODUCTS AND OF CORRESPONDING ISOTOPES FROM LIQUID WASTE

Hubert Prochazka, Brno; Karel Stamberg, Prague; Rudolf Jilek, Brno; Pavel Hulak, Ceske Budejovice, and Josef Katzer, Prague, all of Czechoslovakia, assignors to Ceskoslovenska komise pro atomovou energii, Prague, Czechoslovakia

Continuation-in-part of Ser. No. 353,527, April 24, 1973, abandoned. This application Mar. 3, 1975, Ser. No. 555,172

Claims priority, application Czechoslovakia, May 16, 1972, 3291/72

Int. Cl.² B01D *15/06*

U.S. Cl. 210—28 **11 Claims**

1. Method of separation of fission and corrosion products as well as corresponding isotopes from liquid waste by using therefor biosorbents having chelate-forming and active exchange groups, comprising the steps of contacting the liquid waste with a biosorbent to form a precipitate inside the pores and on the surface of the biosorbent, the biosorbent being then activated by an at least two-stage regeneration, in the first stage the biosorbent being regenerated by being eluted with solutions of compounds selected from the group consisting of ferric chloride, aluminum nitrate, copper sulphate, calcium chloride and manganese sulphate having a concentration of from 0.1M to saturation so that the cationic component thereof is recaptured onto the biosorbent, and in the second stage the biosorbent being regenerated by eluting with a solution of compounds selected from the group consisting of sodium hydroxide, potassium ferrocyanide, sodium carbonate and potassium permanganate having a concentration of from 0.1 M to saturation, the anionic component of which is capable of reacting with the recaptured cation thereby giving rise to a precipitate inside the pores and on the surface of the biosorbent.

3,993,559

PROCESS FOR ELIMINATING REACTIVE CHLORINATED ORGANIC COMPOUNDS FROM AQUEOUS SOLUTIONS

Werner Opavsky, and Elvira Macpherson, both of Cologne, Germany, assignors to Wacker-Chemie GmbH, Munich, Germany

Filed May 14, 1975, Ser. No. 577,251

Claims priority, application Germany, June 24, 1974, 2430193

Int. Cl.² B01D *21/01*

U.S. Cl. 210—54 **5 Claims**

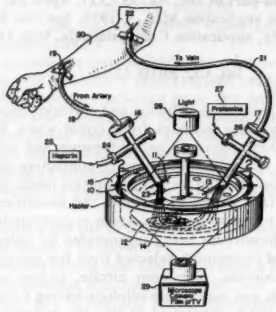
1. A process for removing chlorinated organic compounds from waste waters containing from 0.5 to 15% by weight of organically bound chlorine, said chlorinated organic compounds being reactive at the specified reaction temperatures, the process comprising reacting the waste waters at temperatures from 70° to 300° C with a compound selected from the group consisting of ammonia, primary amines, compounds splitting off said ammonia and said primary amines at the reaction temperatures, and mixtures of said compounds, the molar ratio of organically bound chlorine and the selected reactant being 1 0.3 – 5 and the pH value of the solution after reaction being from 3 – 10, thereby obtaining isoluble reaction products which are separated from the reaction solution by one of the processes of filtration, sedimentation and centrifugation.

3,993,560

METHOD AND APPARATUS FOR MONITORING CELLULAR ACTIVITIES

Richard M. Halpern, 1125 Maytor Place, Beverly Hills, Calif. 90210

Filed Feb. 27, 1975, Ser. No. 553,502
Int. Cl.² B01D *31/00*
U.S. Cl. 210—94 **2 Claims**



1. An apparatus for monitoring cellular activities in tissue to be examined from a given patient including in combination:

a. a closed sterile chamber for holding said tissue culture having transparent top and bottom covers so that the interior of the chamber can be viewed from above and below said chamber having an access opening for receiving said tissue culture;

b. annular heating means surrounding said chamber in a manner so as not to interfere with observation of the interior of the chamber through said top and bottom covers and provide a controlled temperature in said chamber;

c. inlet valve means adjacent to one edge of the top surface of the chamber for connection to said patient's artery and including a branch valve connecting means for introducing chemicals to blood entering said chamber;

d. outlet valve means adjacent to another edge of the top surface of said chamber for connection to said patient's vein and including a branch valve connecting means for introducing other chemicls to the blood to neutralize the effect of said first mentioned chemicals prior to the blood returning to the patient; and

e. filter means in the form of a bundle of hollow dialyzing fibers in said chamber connecting said inlet valve means to said outlet valve means, whereby said patient's blood may be continuously circulated through said filter means in said chamber to nourish cells in said tissue and remove metabolic waste products while visually monitoring cellular activities through said transparent covers.

3,993,561

FUEL FILTER

Edward J. Swearingen, P.O. Box 32622, San Antonio, Tex. 78216

Filed June 16, 1975, Ser. No. 587,224
Int. Cl.² B01D *27/10*
U.S. Cl. 210—131 **5 Claims**

1. A fuel filter having a bypass flow passage in case of fuel icing, comprising:

a cylindrical housing having an inlet at one end thereof and an outlet at the other end thereof;

cylindrical screen means concentrically arranged in said cylindrical housing;

piston means abutting a first end of screen means, a second end of said screen means circumscribing said inlet, said piston means including outward extensions to maintain said piston means and screen means substantially along a center axis of said housing, said piston means being generally cup shaped with said screen means circumscribing said cup shape and abutting said outward extensions, the bottom of said cup shape being a target area for directing fuel through said screen means;

spring means forcing said piston means against said screen means;

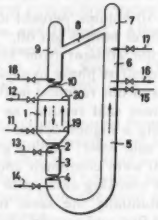
spacer means between said piston means and said outlet, said spacer means counteracting the force of said spring means and having passages therethrough for allowing flow around said spring means and out said outlet, said spring means being located between said piston means and said spacer means with said passages of said spacer means being located around said spring means to prevent freeze up in said spring means.

3,993,562

LOOP-STYLE CONTINUOUS ION EXCHANGE UNIT

Masazumi Kashiwabara; Wataru Iida, and Hisashi Akatsuka, all of Himeji, Japan, assignors to Idemitsu Kosan Co., Ltd., Tokyo, Japan

Filed Feb. 18, 1975, Ser. No. 550,711
Claims priority, application Japan, Feb. 21, 1974, 49-20108
Int. Cl.² B01D *33/30*
U.S. Cl. 210—189 **9 Claims**



1. A loop-style continuous ion exchange apparatus, comprising:

a liquid treating section (1) including an inlet and outlet for a liquid;

first valve means (10) including only a single valve;

a back-washing section (9) including a back washing fluid inlet and a material receiving inlet for receiving material to be washed, said back-washing section (9) being coupled to said liquid treating section (1) via said first valve means (10) and located above said liquid treating section (1) such that material from said back-washing section (9) is fed to said liquid treating section (1) from said back-washing section (9) via said first valve means (10) under the influence of gravity;

second valve means (2) including only a single valve;

a material weighing and transfer section (3) coupled to said liquid treating section (1) via said second valve means (2) and located below said liquid treating section (1) such that used material from said liquid treating section (1) is fed to said material weighing and transfer section (3)

from said liquid treating section (1) via said second valve means (2) under the influence of gravity;

third valve means (4) including only a single valve;

a regeneration section (5) coupled to said material weighing and transfer section (3) via said third valve means (4) for receiving said used material therefrom and including means for regenerating said used material;

a washing section (6) including an inlet and outlet for washing fluid, said washing section being coupled to said regeneration section (5) for washing regenerated material received from said regeneration section (5), the upper part of said washing section (6) being located at a higher level than said material receiving inlet of said back-washing section (9); and

inclined conduit means (8) coupling said upper part of said washing section (6) to said material receiving inlet of said back-washing section (9), said conduit means (8) being downwardly inclined from said upper part of said washing section (6) to said material receiving inlet of said back-washing section (9) to feed washed material from said washing section (6) to said back-washing section (9) under the influence of gravity.

3,993,563

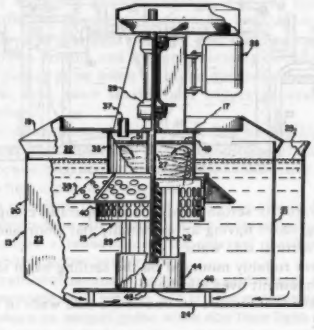
GAS INGESTION AND MIXING DEVICE

Vernon R. Degner, Citrus Heights, Calif., assignor to Envirotech Corporation, Menlo Park, Calif.

Filed Apr. 28, 1975, Ser. No. 572,700

Int. Cl.² B03D *1/00*

U.S. Cl. 210—221 M **3 Claims**



1. In an apparatus for ingesting and mixing gas into a liquid body to promote chemical or physical reactions therein, which apparatus includes a tank for holding a body of liquid, an impeller fixed to a vertically-extending drive shaft for rotation in submergence in the liquid body to cause a flow of liquid radially outward from the impeller and a vertically-extending conduit whose diameter generally exceeds the diameter of the impeller and which is arranged concentrically about the drive shaft and extends to a location in the liquid body adjacent to the impeller to define a channel of communication between a source of gas and the impeller and which further is arranged such that a liquid vortex rises along the wall of the conduit when the rotor is turned at high speeds; the improvement comprising:

a. a baffle fixedly mounted within the conduit above the impeller to turn the liquid vortex downwardly whenever the same rises to a predetermined elevation in the conduit; and

b. said baffle including a member having an enlarged aperture formed centrally therethrough to provide a flow path for gas to pass downwardly through said conduit to said rotor and having a smooth flat undersurface which is horizontally arranged to meet a rising liquid vortex.

3,993,564

FILTRATION APPARATUS

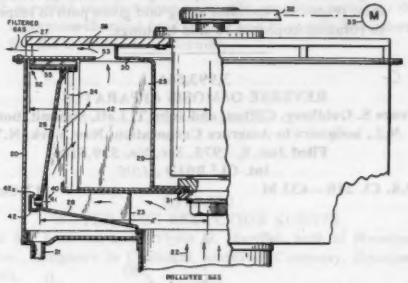
Richard A. Novak, Boston, Mass., assignor to Advanced Product Engineering Corporation, Boston, Mass.

Continuation of Ser. No. 242,103, April 7, 1972, abandoned. This application Jan. 23, 1974, Ser. No. 435,987

The portion of the term of this patent subsequent to Apr. 11, 1989, has been disclaimed.

Int. Cl.² B01D *46/26*

U.S. Cl. 210—360 A **9 Claims**



1. In an apparatus for removing particulate matter from a fluid medium including a housing, a rotatable cylindrical filter mounted for rotation within the housing, a shell surrounding said filter positioned in said housing for rotation with said filter and defining a space for the entry of the fluid medium and particulate for filtering, means for permitting the passage of the particulate matter from the apparatus after filtering, means for feeding the fluid medium containing particulates to be filtered into said space, the improvement comprising aerodynamic seal means rotating with said shell to prevent bypass of said filter by said fluid medium and particulates, said seal means having an outermost diameter d2 which exceeds the outermost diameter d1 of the shell.

3,993,565

INCREMENTAL FEED SYSTEM

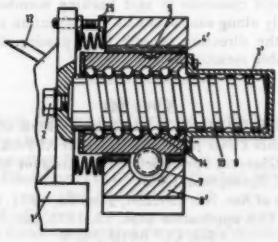
Johannes Jacobus Holthuis, Veendam, Netherlands, assignor to Nederlandse Industrie voor Baggerwerktuigen Nivoba N.V., Veendam, Netherlands

Filed Oct. 12, 1972, Ser. No. 296,814

Claims priority, application Netherlands, Oct. 13, 1971, 7114104

Int. Cl.² B01D *33/36*

U.S. Cl. 210—396 **9 Claims**



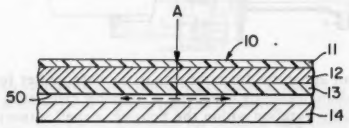
1. A precision system for moving a tool comprising, in combination:

a frame with respect to which a tool is to be moved along a given rectilinear path;

at least a pair of spindles fixed to said frame, said spindles being parallel and disposed with their axes aligned along said rectilinear path;

a tool carrier having a tool fixed thereto;
a pair of bushings rotatably journalled in and axially fixed to said tool carrier, one such bushing surrounding one of said spindles and the other bushing surrounding the other spindle; and each bushing having a circumferentially extending worm wheel thereon;
drive shaft means having worms thereon for intermittently rotating said bushings to impart desired incremental movement of said tool carrier along said given path; and
micrometer drive means connecting each bushing to its respective spindle for displacing said bushings axially of their respective spindles along said given path in response to rotation imparted to said bushings.

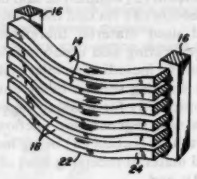
3,993,566
REVERSE OSMOSIS APPARATUS
Bruce S. Goldberg, Clifton, and John T. Loft, Summit, both of N.J., assignors to Amerace Corporation, New York, N.Y.
Filed Jan. 8, 1975, Ser. No. 539,510
Int. Cl.² B01D *31/00*
U.S. Cl. 210—433 M **12 Claims**



1. Apparatus for use in a reverse osmosis system comprising in combination, at least one semipermeable membrane, at least one porous support member for supporting said semipermeable membrane, and at least one microporous backing member for supporting said semipermeable membrane and said support member, said microporous backing member comprising a polymeric resinous matrix having particles of inorganic filler material dispersed throughout said matrix and a network of micropores formed therein, said dispersed filler being present in said member in an amount by weight of at least about 50%, said backing member having a porosity of at least about 50%, said backing member having at least a pair of opposed sides and including a plurality of channels extending longitudinally with respect to a normal to at least one of said opposed sides, said semipermeable membrane being mounted upon said support member, and said support member being mounted relative to said microporous backing member such that fluid passing through said semipermeable membrane under pressure exceeding the osmotic pressure of said system is adapted to pass through said porous support member and enter said channels in said backing member and flow longitudinally along said channels in a direction substantially normal to the direction of said fluid passing through said semipermeable membrane.

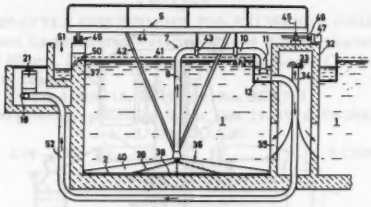
3,993,567
BAR OR WIRE-LIKE ELEMENTS FOR USE IN CLASSIFYING AND SCREENING APPARATUS
Marvin E. Ginaven, Springfield, Ohio, assignor to The Bauer Bros. Co., Springfield, Ohio
Division of Ser. No. 157,254, June 28, 1971, Pat. No. 3,777,893. This application Sept. 12, 1973, Ser. No. 396,351
Int. Cl.² B01D *39/10*
U.S. Cl. 210—498 **6 Claims**

1. A screen element for joining with other like elements in defining a screen surface over which liquid slurry embodying solids may flow for separating and classifying purposes, said screen element being designed to orient in a sense transverse to a slurry flow and having an elongate bar-like form a surface portion of which provides a segment of the screen flow surface, said element having at least one portion thereof intermediate its ends laterally offset with respect to said ends, said laterally offset portion being configured to provide that the



flow surface portion thereof has a progressively changing width intermediate its ends.

3,993,568
SLUDGE SETTLING BASIN
Kamil Fux, Schiebel, Switzerland, assignor to Prometall Uznach AG, Uznach, Switzerland
Continuation of Ser. No. 460,446, April 12, 1974, abandoned. This application Oct. 9, 1975, Ser. No. 621,003
Claims priority, application Switzerland, Apr. 16, 1973, 5426/73; Nov. 19, 1973, 16205/73
Int. Cl.² B01D *21/24*
U.S. Cl. 210—527 **2 Claims**



1. Apparatus for settling sludge, said apparatus comprising:
a settling basin having an essentially flat floor and essentially vertical side walls;
a platform rollably mounted on the settling basin structure for movement over said basin;
a fixed channel located on one of the side walls of the said basin;
a siphon tube secured to the platform and movable therewith, consisting essentially of
a mouthpiece defining a suction gap which extends over the entire width of the basin floor, the mouthpiece being formed with internal partitions subdividing said suction gap of said mouthpiece into component channels and disposed in convergent positions to reduce the cross section of the channels from the suction gap to the upper end of the mouthpiece,
a first tube portion connected to the mouthpiece extending directly upwardly from adjacent the floor of the basin,
a second portion directly extending horizontally and transversely over said basin and suspended below the platform at a fixed height only slightly above the maximum level of liquid in the settling basin,
and a third portion extending downwardly into said channel;
and a controllable pump positioned at a fixed location with respect to said basin, the pump having a variable delivery rate and being in hydraulic communication with said channel and connected to pump material from said channel to control flow through the siphon tube due to the level difference between the materials in the settling basin and the channel by controlling the delivery rate of the pump pumping material from the channel.

3,993,569

PHOTOELECTRICALLY TRIGGERED TIMING CIRCUIT FOR CONTROLLING ELECTRICALLY RESPONSIVE LOAD APPARATUS IN RESPONSE TO ALTERNATE LIGHT CHANGES

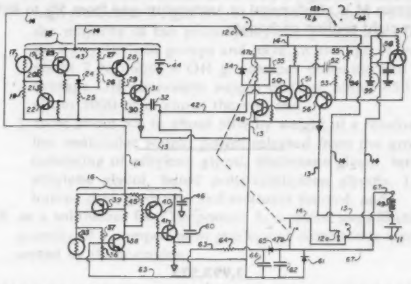
Herbert G. Zinsmeyer; David A. Biedermann, and Francis D. Orr, all of Austin, Tex., assignors to Lois M. Zinsmeyer, Austin, Tex.

Filed Sept. 23, 1971, Ser. No. 183,093

The portion of the term of this patent subsequent to July 23, 1991, has been disclaimed.

Int. Cl.² H01J 39/12; H01H 47/24

U.S. Cl. 250—209 **15 Claims**



1. An improved photoelectrically triggered timing circuit for controlling electrically responsive load apparatus in response to alternate light changes, said circuit comprising:

A. a dawn sensing and trigger generating circuit to produce an output pulse when nightime darkness changes to daylight, said dawn sensing and trigger generating circuit having

1. a dawn photoelectric sensor cell having high internal electrical resistance during conditions of darkness and converting to an electrically conductive condition when exposed to daylight,
2. a transistor trigger pulse generating circuit designed to produce an output pulse when increasing light at dawn causes a reduction in the internal resistance of the photoelectric sensor cell,
3. transistor means of amplifying said trigger pulse;

B. a separate dusk sensing and trigger generating circuit to produce an output pulse when day time light changes to darkness said dusk sensing and trigger generating circuit having

1. a dusk photoelectric sensor cell having high internal electric resistance during conditions of darkness and converting to an electrically conductive condition when exposed to daylight,
2. a transistor trigger pulse generating circuit designed to produce an output pulse when decreasing light at dusk causes an increase in the internal resistance of the dusk sensing photoelectric cell,
3. transistor means of amplifying said trigger pulse;

C. a control relay mechanism with an actuating solenoid winding and switch means to apply or interrupt the application of electric power to an electromechanical load device;

D. a normally turned off relay driver transistor circuit designed to control the flow of electric current to the actuating winding of said control relay mechanism when driven into its conductive turned on state with means for driving said relay driver transistor circuit into conduction;

E. a transistorized R-C timer circuit having

1. input means to said timer circuit from the dawn trigger generating circuit and from the dusk trigger generating circuit so that the timer can be triggered into conductive turned on condition by an input trigger from either of these trigger generator sources,
2. an adjustable R-C time constant circuit adapted to hold the timing transistors in conduction through a controlled period of time,
3. output signal means from the adjustable timer circuit coupled back to the base input of the relay driver transistor circuit to control the conductivity of said relay driver circuit;

F. connective means for supplying controlled power to an electromechanical load device; and

G. a power supply source to supply operative power to the electromechanical load device and to supply Vcc power for the transistorized circuitry.

3,993,570

WATER LOSS REDUCTION AGENTS

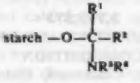
Jack M. Jackson, and Arlynn H. Hartfiel, both of Houston, Tex., assignors to Chemical Additives Company, Houston, Tex.

Continuation-in-part of Ser. No. 355,166, March 27, 1975, abandoned. This application July 14, 1975, Ser. No. 595,852

Int. Cl.² C09K 7/02

U.S. Cl. 252—8.5 A **5 Claims**

1. An aqueous clay-free, non-thixotropic wellbore fluid having improved fluid loss control at high temperatures for use in subterranean formations in the earth consisting essentially of water, at least 1% of a brine forming soluble salt or mixtures of salts of potassium sodium or calcium and amino ether starch having the structural formula



wherein R^1 is OH, CH_2OH; or H; R^2 is hydrocarbyl having from 1 to 8 carbon atoms selected from the group consisting of alkyl, cycloalkyl, aryl, alkaryl and aralkyl or H; R^3 and R^4 are H or hydrocarbyl having from 1 to 8 carbon atoms selected from the group consisting of alkyl, cycloalkyl, aryl, alkaryl and aralkyl, said amino starch ether being present in at least an amount in the range of about 0.15 to 30 grams per liter of wellbore fluid.

3,993,571

SPIN FINISH FOR YARN USED IN FOOD PACKAGING

Robert Moore Marshall, Chester, Va., assignor to Allied Chemical Corporation, Morris Township, N.J.

Filed Apr. 11, 1975, Ser. No. 567,150

Int. Cl.² D06M 5/10

U.S. Cl. 252—8.9 **4 Claims**

1. A spin finish composition for treating synthetic filamentary yarn used in food packaging consisting essentially of about 47 to 53 weight percent of said composition of a compound selected from the group consisting of butyl stearate and coconut oil; about 16 to 20 weight percent of said composition of sorbitan monooleate; and about 30 to 34 weight percent of said composition of ethoxylated sorbitan monooleate, said ethoxylated sorbitan monooleate being ethoxylated with about 20 moles of ethylene oxide.

3,993,572

RARE EARTH CONTAINING CATALYST COMPOSITION

Saul G. Hindin, Mendham, and Joseph C. Dettling, Jackson, both of N.J., assignors to Engelhard Minerals & Chemicals Corporation, Murray Hill, N.J.

Continuation-in-part of Ser. No. 278,084, Aug. 4, 1972, abandoned. This application Dec. 10, 1973, Ser. No. 423,092
Int. Cl.² B01J 23/10, 21/04
U.S. Cl. 252—462 5 Claims

1. A composition consisting essentially of a relatively catalytically-inert, solid support having coated thereon a minor amount of a catalytically-active composite consisting essentially of a catalytically-effective amount of a platinum group metal selected from the group consisting of platinum, palladium, ruthenium, iridium and rhodium, added to an admixture of a rare earth metal oxide and alumina, said admixture containing alumina in an amount in the range of 70–99% by weight and selected from the group consisting of γ-alumina, η-alumina, κ-alumina and δ-alumina and containing a rare earth metal oxide in an amount in the range of 1–30% by weight and selected from the group consisting of cerium oxide, lanthanum oxide, samarium oxide and praseodymium oxide, said admixture having a relatively high surface area of at least about 75 m² per gram and having been derived from alumina or an aluminum compound and from said rare earth metal oxide or a compound of said rare earth metal which has been calcined at a temperature of at least 750° C. to yield said alumina and said rare earth metal oxide.

3,993,573

SOFTENING ADDITIVE AND DETERGENT COMPOSITION

Robert Andrew Gloss, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Division of Ser. No. 333,104, Feb. 16, 1973, Pat. No. 3,954,632. This application Jan. 28, 1976, Ser. No. 653,048
Int. Cl.² C11D 1/62, 3/12
U.S. Cl. 252—89 R 2 Claims

1. A detergent composition comprising

a. from about 2% to about 30% by weight of a detergent compound selected from the group consisting of anionic detergents, nonionic detergents, ampholytic detergents, zwitterionic detergents and mixtures thereof;

b. from 0% to about 60% by weight of an organic or inorganic detergent builder salt;

c. from about 1% to about 50% by weight of a smectite-type clay softening agent having an ion exchange capacity of at least about 50 meq/100 g.; and

d. from about 0.5% to about 15% by weight of a substantially water-insoluble quaternary ammonium anti-static agent of the formula $[R_2N^+R'_2]_nM^{n-}$, wherein each R is a hydrocarbyl group containing from about 10 to about 22 carbon atoms, each R′ is a hydrocarbyl group containing from 1 to about 4 carbon atoms, X is an anion and *n* is an integer from 1 to 3, at a weight ratio of said smectite-type clay to quaternary ammonium anti-static agent of from about 40:1 to about 1:1;

e. from about 0.5% to about 15% by weight of a component selected from the group consisting of

i. fatty acids having from about 8 to about 30 carbon atoms in the alkyl chain;

ii. compounds selected from the group consisting of benzene mono-, di- and tricarboxylic acid containing from 0 to 2 hydroxyl functions; and

iii. mixtures of the above-described compounds.

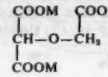
3,993,574

BUILDER COMPOSITIONS

Thomas Christ, Belleville, Ill., and Robert P. Langguth, Overland, Mo., assignors to Monsanto Company, St. Louis, Mo.

Filed Aug. 22, 1975, Ser. No. 606,901
Int. Cl.² C11D 7/12, 7/26, 7/60
U.S. Cl. 252—89 R 2 Claims

1. A builder composition consisting essentially of from 60% to 95% by weight of a compound represented by the formula



wherein M is alkali metal or ammonium and from 5% to 40% by weight sodium carbonate.

3,993,575

HARD SURFACE ACID CLEANER AND BRIGHTENER

Joseph Howanitz, Wayne, N.J., and Irwin Greenberg, Brooklyn, N.Y., assignors to Fine Organics Inc., Lodi, N.J.

Filed May 27, 1975, Ser. No. 580,720
Int. Cl.² C11D 7/32
U.S. Cl. 252—142 13 Claims

1. A cleaner concentrate, comprising an aqueous solution of from about 5 to about 30 per cent of a dicarboxylic acid of the formula HOOC—R—COOH, where R is a direct bond or straight or branched chain alkylene of 1 to 4 carbon atoms and from about 3 to about 15% of an amine of the formula:

where R_1 and R_2 are independently selected from hydrogen, lower alkyl, or hydroxy lower alkyl, and R_3 is lower alkyl, lower cycloalkyl or hydroxy lower alkyl, the amount of the amine being sufficient to provide the solution with a pH of from about 1 to about 2.5.

11. A cleaner concentrate consisting essentially of from about 5 to about 30 per cent of a dicarboxylic acid of the formula HOOC—R—COOH, where R is a direct bond or straight or branched chain alkylene of 1 to 4 carbon atoms, from about 3 to about 15 per cent of an amine of the formula:

where R_1 and R_2 are independently selected from hydrogen, lower alkyl, or hydroxy lower alkyl, and R_3 is lower alkyl, lower cycloalkyl or hydroxy lower alkyl; at least one member selected from the group consisting of from about 2 to about 6.5 per cent of a hydroxycarboxylic acid having from 1 to 6 hydroxy groups and 1 to 3 carboxylic acid groups and from about 1 to about 4 per cent of an acid stable wetting agent; and from about 44.5 to about 90 per cent water; the concentrate being in the form of an aqueous solution; the amount of the amine being sufficient to provide the solution with a pH of from about 1 to about 2.5.

3,993,576

MIXTURES OF HIGH AND LOW MOLECULAR WEIGHT POLYOLS RESISTANT TO PHASE SEPARATION

Benny Gene Barron, Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Filed May 20, 1974, Ser. No. 471,405

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 10, 1976

Int. Cl.² C08G *18/65*

U.S. Cl. 252—182 13 Claims

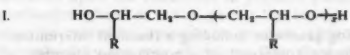
1. A composition resistant to phase separation which comprises:

A. an insoluble mixture which is susceptible to phase separation which comprises:

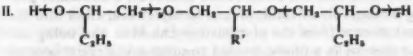
1. from about 95% to about 50% by weight of a relatively high molecular weight polyoxy alkylene polyol wherein the majority of the polyoxyalkylene groups are other than oxyethylene groups and have an average of from about 2 to about 4 OH groups per molecule and an average OH equivalent weight of from about 650 to about 3000 or mixtures thereof, and

2. from about 5% to about 50% by weight of a relatively low molecular weight polyol selected from the group consisting of ethylene glycol, diethylene glycol, tetraethylene glycol, liquid polyoxyethylene glycols, 1,4-butane diol, glycerine and mixtures thereof; and

B. as a solubilizer for Component A, a minor but effective quantity of a compound or mixture of compounds represented by the formulas

I. 

wherein R is methyl or ethyl and x has a value from 0 to about 3 with the proviso that when x is O, R is ethyl;

II. 

wherein R′ is hydrogen or methyl, y and z independently have a value from zero to about 2 with the proviso that at least one of y and z must have a value of at least 1.

3,993,577

METHOD FOR PRODUCTION OF HEAT AND HYDROGEN GAS

Stanley A. Black, Port Hueneme, and James F. Jenkins, Camarillo, both of Calif., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Division of Ser. No. 507,652, Sept. 19, 1974, Pat. No. 3,906,926. This application Dec. 8, 1975, Ser. No. 638,712

Int. Cl.² C09K *3/00*

U.S. Cl. 252—188 10 Claims

1. The method of rapidly producing heat and hydrogen gas, comprising:

a. producing a composite powdered material consisting of an intimate mixture of magnesium and iron particles by placing finely divided magnesium and iron particles which range in size up to 590 microns in diameter and up to equal part by weight of iron particles to magnesium particles in a ball mill with an inert solvent and grinding the particles together until a substantial portion of the iron particles become embedded on the magnesium particles to form miniature shunted electrochemical cells and to increase the area of iron particles in contact with the magnesium particles, and removal of the solvent following the grinding;

b. adding seawater electrolyte to said composite material at a controlled rate for closely controlling the resulting exothermic reaction and thus the generation of heat and hydrogen.

3,993,578

PROCESS FOR CONTROLLING THE GEOMETRICAL PROPERTIES OF PARTICLES OF CERAMIC MATERIALS

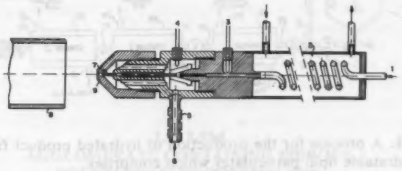
Panayotis Gerontopoulos, and Carlo Fantuz, both of Leghorn, Italy, assignors to AGIP NUCLEARE, S.p.A., Milan, Italy

Filed Feb. 22, 1974, Ser. No. 444,773

Claims priority, application Italy, Feb. 23, 1973, 20749/73

Int. Cl.² G21C *3/54*

U.S. Cl. 252—301.1 R 1 Claim



1. In a process of preparing microspherical particles of nuclear fuel which comprises making an aqueous solution of a salt of a metal constituting the nuclear fuel that is precipitated by a basic medium, admixing with said aqueous solution a water soluble resin that increases in viscosity in the presence of an alkali, dispersing the resultant solution into droplets and feeding said droplets as they are formed into an aqueous alkaline solution whereby spheroids are formed therefrom, and then drying and calcining the spheroids, wherein the improvement comprises controlling the geometrical properties of said particles by thermostating said resultant solution immediately before said dispersion into droplets so that the droplets which are fed into said aqueous alkaline solution have a predetermined temperature.

3,993,579

METHOD OF ENCAPSULATING SOLID RADIOACTIVE WASTE MATERIAL FOR STORAGE

Lee Roy Bunnell, Kennewick, and J. Lambert Bates, Richland, both of Wash., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Oct. 22, 1975, Ser. No. 624,805

Int. Cl.² G21F *9/34*

U.S. Cl. 252—301.1 W 8 Claims

1. A method of preparing solid high-level radioactive waste material for storage by encapsulating the material in vitreous carbon comprising:

mixing powdered high-level radioactive material less 325 mesh with a curable resinous material selected from the group consisting of polyfurfuryl alcohol and phenolformaldehyde to form a resinous mixture containing up to 70 weight percent waste material;

forming the resinous mixture into appropriate shapes for storage;

curing the shaped resinous mixture; and

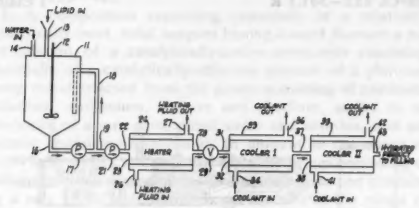
heating the cured shapes to from 600° to 1000° C. under a vacuum or inert atmosphere at a rate of about 6° C. per hour for a period of time sufficient to carbonize the cured resinous material to vitreous carbon, thereby forming shapes of high-level radioactive material encapsulated in vitreous carbon for storage.

3,993,580

CONTINUOUS PRODUCTION OF HYDRATED LIPIDS

Thom B. Galusky, Medina, Ohio, assignor to SCM Corporation, New York, N.Y.

Filed May 13, 1974, Ser. No. 469,104
Int. Cl.² B01J *13/00*; B01F *3/12*
U.S. Cl. 252—311 3 Claims



1. A process for the production of hydrated product from hydratable lipid particulates which comprises:

forming a suspension in water of said particulates at a temperature where substantially no hydration of said lipid particulates occurs;

passing an input stream of said suspension continuously into a swept-surface, indirect heater;

therein heating said input stream to pumpable hydration temperature while mechanically working said stream into a plastic mass;

continuously withdrawing an exit stream of resulting plastic mass from said heater;

subjecting the withdrawn exit stream to shear stress sufficient for increasing its smoothness;

continuously passing the resulting smoothed, withdrawn exit stream into a swept-surface, indirect cooler;

therein cooling said smoothed stream to a stabilizing, yet pumpable temperature; and

continuously withdrawing the resulting cooled, smoothed stream from said cooler.

3,993,581

PROCESS FOR PREPARING STABLE OXYGEN TRANSFERABLE EMULSION

Kazumasa Yokoyama, Suita; Koichi Yamanouchi, Sakai; Ryoichiro Murashima, Kashihara, and Ryozo Watanabe, Takatsuki, all of Japan, assignors to The Green Cross Corporation, Osaka, Japan

Division of Ser. No. 439,638, Feb. 4, 1974, Pat. No. 3,962,439.
This application July 2, 1974, Ser. No. 485,318
Claims priority, application Japan, Oct. 5, 1973, 48-112047
Int. Cl.² B01J *13/00*
U.S. Cl. 252—312 17 Claims

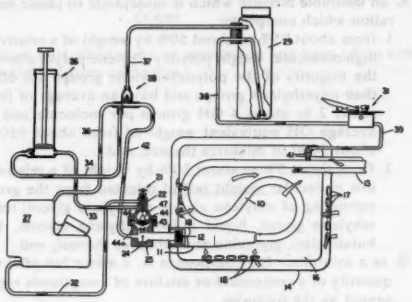
1. A process for preparing a stable emulsion in a physiologically acceptable aqueous medium, of an oxygen-transferable saturated aliphatic perfluorocarbon compound having 9 to 11 carbon atoms and a particle size of about 0.05 to about 0.3 μ, the perfluorocarbon compound having a boiling point ranging from about 140° to about 160° C. and having at least one alicyclic ring, heterocyclic ring, nitrogen atom or oxygen atom, consisting essentially of homogeneously mixing a phospholipid of 2 to 6% (W/V) as emulsifier, at least one fatty acid compound of 0.001 to 0.1% (W/V) as emulsifying adjuvant selected from the group consisting of fatty acids having 8 to 22 carbon atoms, physiologically acceptable salts and monoglycerides thereof, and said perfluorocarbon compound of 10 to 40% (W/V) in said physiologically acceptable aqueous medium to obtain a crude emulsion, and further emulsifying the crude emulsion by injecting it at a temperature of 45° to 55° C through a slit under a pressure of about 100 kg/cm² to 500 kg/cm², thereby subjecting it to shearing force and mixing action based on a strong velocity gradient until the particle size of the perfluorocarbon compound in the resulting emulsion reaches 0.05 to 0.3 μ.

3,993,582

PULSE FOG GENERATOR

Russell R. Curtis, Indianapolis, Ind., assignor to Curtis Dyna Products Corporation, Westfield, Ind.

Filed July 26, 1974, Ser. No. 492,035
Int. Cl.² B01J *13/00*
U.S. Cl. 252—359 A 3 Claims



1. A pulse fog generator including a resonant intermittent combustion device composed of a combustion chamber, a sinuous exhaust tube communicating with said combustion chamber, one end of said tube discharging the gases resulting from combustion, a fuel tank and means for injecting fuel from the tank into the combustion chamber, a container providing a reservoir of fluid, means to inject said fluid into the exhaust stream from the combustion chamber and being dispersed thereby in a finely divided condition, electrical ignition means for the combustion device and a manually operated air pump for providing an initial air charge to said combustion chamber and to said container and thus producing charging pressure for the fluid to be injected into the exhaust stream, a vertical plate supporting the combustion chamber and exhaust tube on one of its side faces and supporting the container, fuel tank, air pump and ignition means on the other side face so that the plate acts as a barrier between the combustion chamber element and the other components, said exhaust tube being enclosed in a housing supported in spaced relation to the adjacent face of said plate to thereby permit circulation of convection air flow between said housing and said plate, said means for injecting fuel into the combustion chamber including a fuel valve interposed between said fuel tank and said combustion chamber, said fuel valve having combustion chamber pressure controlled fuel delivery apertures for delivering an atomized fuel-air mixture to the combustion chamber, said fuel valve including means providing a generally frusto-conical chamber overlying the inlet side of said fuel delivery apertures with the smaller end of said chamber farthest from said fuel delivery apertures, the smaller end of said end of said chamber being defined by a transverse baffle wall having a central opening therein, a further baffle wall spaced from said first mentioned baffle wall and extending over the major portion of said central opening, a fuel supply orifice tube extending freely through a central aperture in said further baffle wall and aligned with the longitudinal axis of said frusto-conical chamber, means for supplying fuel under pressure to said orifice tube and means for supplying air to the area surrounding said tube so that as air flows into said frusto-conical chamber it flows parallel to said orifice tube to entrain fuel droplets issuing from the tube, the reverse flow of combustion gases through said frusto-conical chamber being impeded by said first mentioned baffle wall and the said exten-

sion of said further baffle wall over said central opening of the first mentioned baffle wall.

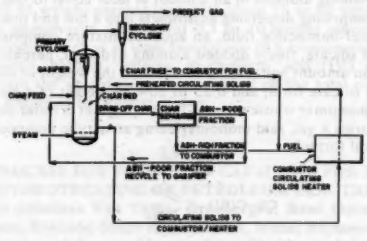
3. A pulse fog generator including a resonant intermittent combustion device composed of a combustion chamber, a sinuous exhaust tube communicating with said combustion chamber, one end of said tube discharging the gases resulting from combustion, a fuel tank and means for injecting fuel from the tank into the combustion chamber, a container providing a reservoir of fluid, means to inject said fluid into the exhaust stream from the combustion chamber and being dispersed thereby in a finely divided condition, electrial ignition means for the combustion device and a manually operated air pump for providing an initial air charge to said combustion chamber and to said container and thus producing charging pressure for the fluid to be injected into the exhaust stream, a vertical plate supporting the combustion chamber and exhaust tube on one of its side faces and supporting the container, fuel tank, air pump and ignition means on the other side face so that the plate acts as a barrier between the combustion chamber element and the other components, said exhaust tube being enclosed in a housing supported in spaced relation to the adjacent face of said plate to thereby permit circulation of convection air flow between said housing and said plate, a tube providing communication between said combustion chamber and the extreme upper portion of the interior of said fluid container and above the fluid level therein, and a check valve permitting the flow of gases into said container but substantially impeding the flow of gases out of the container to thereby pressurize the interior of said container upon the occurence of pressure pulses within said combustion chamber but to permit the interior of said container to return to atmospheric pressure after a time delay determined by the rate of reverse flow through said check valve subsequent to shut-down of said combustion device, said check valve taking the form of a tubular member formed of elastomeric material, the bore of said tubular member terminating at one end in a slot which is closed except when the bore is under a predetermined pressure, and a by-pass aperture formed in said tubular member which remains open independently of the open or closed position of said slot.

3,993,583

GASIFICATION OF ASH CONTAINING CARBONACEOUS SOLIDS

Leonard Seglin, New York, N.Y., assignor to COGAS Development Company, Princeton, N.J.

Filed Mar. 17, 1976, Ser. No. 667,540
Int. Cl.² C01B 2/02; C10J 3/54; C10K 1/02
U.S. Cl. 252—373 **3 Claims**



1. In the process of gasifying ash-containing carbon with steam in a fluidized bed gasifier wherein carbon fines, separated from the synthesis gas, are burned in a slagging combustor, the resulting combustion gases are used to disperse a recycle stream of carbon from the fluidized bed gasifier to heat the recycle stream, the recycle stream is separated from the combustion gases to minimize reaction therewith and the recycle stream is returned to the fluidized bed gasifier to yield up its heat for the gasification reaction, the improvement wherein ash buildup in the gasifier is controlled while supplying additional heat to the gasification reaction comprising the steps of:

a. withdrawing a second stream of char from the fluidized gasifier bed;
b. separating said second stream into an ash-rich portion and an ash-poor portion;
c. feeding the ash-rich portion into the combustor to be burned with the fines; and
d. feeding the ash-poor portion into the fluidized bed gasifier, said second stream being withdrawn at a rate at least sufficiently high so that as much ash is removed from the fluidized bed gasifier as is introduced into it with fresh feed.

3,993,584

AGGLOMERATE CONTAINING FIBROUS POLYTETRAFLUOROETHYLENE

James E. Owen, Shaker Heights, and J. William Vogt, South Russell, both of Ohio, assignors to The Harshaw Chemical Company, Cleveland, Ohio

Continuation-in-part of Ser. No. 316,872, Dec. 20, 1972, Pat. No. 3,838,092. This application Sept. 20, 1974, Ser. No. 507,920
The portion of the term of this patent subsequent to Sept. 24, 1991, has been disclaimed.
Int. Cl.² C09K 3/22
U.S. Cl. 252—383 **4 Claims**

1. A weak, but coherent dust-free agglomerate having a minimum size of about ¼ inch comprising loose particles of a normally dusty material and fibers of fibrillated polytetrafluoroethylene resin distributed throughout said loose particles effective to provide coherence to the agglomerate, the fibers of the resin comprising less than 1 percent by weight of the agglomerate, the physical properties of the particles in the agglomerate remaining unchanged, said agglomerate characterized by an absence of particle to particle adhesion.

3,993,585

ELEVATED HUMAN LIPIDS CONTROL

Joseph Diago Pinto, Hollywood Hills, and Raj Kumar, Pembroke Pines, both of Fla., assignors to American Cyanamid Company, Stamford, Conn.

Filed Jan. 27, 1975, Ser. No. 544,476
Disclosure was also published under second Trial Voluntary Protest Program on Feb. 24, 1976
Int. Cl.² G01N 33/16
U.S. Cl. 252—408 **5 Claims**

1. The method of making an all human elevated lipid control serum for use as a control in assays for lipids which comprises the steps of:

a. treating normal anticoagulant containing plasma with an ion exchange resin to effect clotting;
b. heating the supernatant plasma at 30° to 40°C. for 15 to 45 minutes to precipitate the clot;
c. dialyzing the recovered serum against polyethylene glycol to concentrate the serum; and
d. adding a 10% to 30% solution of Cohn Fraction III-2,1 in 0.1M, pH 7.0–7.4 phosphate buffer to the dialyzed serum in a proportion which provides a final product having concentrations of lipid components in an elevated range.

3. A human elevated lipid control serum for use as a control in assays for lipids prepared by the method of claim 1.

3,993,586

WATER-SOLUBLE COMPLEX OF CUPROUS CHLORIDE, HYDROCHLORIC ACID AND AT LEAST ONE AMINE OR AMINE SALT

Ferdinand Hagedorn; Karlfried Wedemeyer, and Rodulf Mayer-Mader, all of Cologne, Germany, assignors to Bayer Aktiengesellschaft, Germany

Filed Apr. 4, 1974, Ser. No. 457,850

Claims priority, application Germany, Apr. 11, 1973, 2318115

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 10, 1976

Int. Cl.² B01J *31/30*

U.S. Cl. 252—429 R 6 Claims

1. A composition consisting essentially of the aqueous phase reaction product of:

I. cuprous chloride,

II. hydrochloric acid and

III. at least one amine or amine salt having an atomic ratio of carbon to nitrogen less than 14 and being either

a. a pyridine having 1 to 3 alkyl groups as carbon atom substituents thereof,

b. an N,N-dialkylaniline or said aniline having the aromatic nucleus thereof substituted with one or two methyl groups,

c. diethylamine,

d. triethylamine or

e. a hydrochloride of one of the amines of *a* to *d*, reactants I–III for forming said composition being present in amounts producing a water-soluble complex useful as a catalyst for the addition of hydrogen chloride to chloroprene for preparing 1,3-dichlorobutene-(2) in the liquid phase.

3,993,587

PROCESS FOR PREPARING SUPPORTED SUPERACID CATALYSTS SUITABLE FOR ALKYLATION OF AROMATIC HYDROCARBONS

George A. Olah, Shaker Heights, Ohio, and Giuseppe Messina, Alghero (Sassari), Italy, assignors to Societa Italiana Resine S.I.R. S.p.A., Milan, Italy

Filed Nov. 19, 1974, Ser. No. 525,140

Claims priority, application Italy, Nov. 28, 1973, 31748/73

Int. Cl.² B01J *31/02*

U.S. Cl. 252—429 R 17 Claims

1. A method of preparing a superacid supported catalyst, active in the alkylation of aromatic hydrocarbons, comprising the steps of (1) heat-treating a support consisting essentially of alumina at a temperature of at least 400° C, and (2) contacting the thus treated support with at least one Lewis or Bronsted acid selected from the following classes:

a. metal halides defined by the general formula MX_n,

b. compounds of the general formula HMX_{n+1}, and

c. oxyhalides defined by the general formula MOX_m, wherein H stands for hydrogen, O for oxygen, M for a metal selected in the Groups IIIA, IVB, VA, VB and VIB of the Periodic System of Elements, X for a halogen other than iodine, *n* is an integer from 3 to 6 and m is an integer from 1 to 4, and heat-treating at a temperature of at least 150° C during said contact.

14. The method of claim 1, wherein step (2) comprises first impregnating the heat-treated support with a solution of said metal halide in the form of a complex chosen from the group consisting of the complexes of metal halides MX_n with sulphur dioxide, sulphur trioxide and ethers and $ArH_5{}^+MX^-{}_{n+1}$ complexes, Ar being an aryl radical, and then the impregnated support is heat-treated at a temperature from 150° to 500° C for a period of at least 30 minutes.

3,993,588

POLYMERIZATION CATALYST

Prem Sagar Thukral, Kenley, England, assignor to The British Petroleum Company Limited, London, England

Filed Dec. 4, 1974, Ser. No. 529,391

Claims priority, application United Kingdom, Dec. 13, 1973, 57738/73

Int. Cl.² C08F *4/02*, *4/16*, *4/20*, *4/22*

U.S. Cl. 252—429 C 12 Claims

1. A process for the production of a supported Ziegler catalyst comprising: (a) heating together at a temperature in the range of about 150°–1000° C an inorganic oxide material having surface hydroxyl groups selected from the group consisting of silica and a silica composite containing at least 50% by weight of silica and a magnesium compound selected from the group consisting of magnesium halides and magnesium alkoxides, and (b) incorporating a Group IV(a), V(a), or VI(a) of the Periodic Table transition metal halide, alkoxide, or haloalkoxide compound therein, said catalyst having a magnesium concentration of from about 0.5 to 20% by weight based on the weight of the support material and a concentration of transition metal of from 0.5 to 20% by weight based on the total weight of the catalyst.

3,993,589

PREPARATION OF SPHEROIDAL SILICO-ALUMINA PARTICLES

Jacques Maurice Jules Ghislain André; Raymond Marc Cahen, both of Brussels; Henri Robert Debus, Meise; Rene Odon Lammers, Brussels, and Hugo Johannes Van Thillo, Grimbergen, all of Belgium, assignors to Labofina S.A., Brussels, Belgium

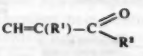
Filed Feb. 10, 1975, Ser. No. 548,185

Claims priority, application Luxembourg, Feb. 18, 1974, 69404

Int. Cl.² B01J *37/00*

U.S. Cl. 252—429 R 10 Claims

1. A process for preparing spheroidal silico-alumina particles containing alumina in an amount at least equal to that of silica, comprising dispersing as droplets into a hot and practically water-immiscible fluid, an aqueous mixture comprising an alkali silicate, finely divided alumina hydrogel, perchloric acid in an amount equal to 75 to 200% of the weight of silica in alkali silicate form, and 0.25 to 20% by weight of a water soluble monomer whose uncross-linked polymer is water-soluble or forms a gel, said monomer being an acrylic compound of general formula



wherein R^1 is selected from the group consisting of H and the methyl radical, R^2 is selected from the group consisting of the $-OR^3$ and $-NR^3R^4$ radicals and wherein R^3 and R^4 are selected from the group consisting of H and a hydrophilic radical, alkali silicate and alumina hydrogel being used in proportions corresponding to 0.5 to 50% by weight of SiO_2 and 99.5 to 50% by weight of Al_2O_3, and maintaining the droplets of the mixture in the fluid under thermal polymerization conditions or in the presence of a free radical polymerization catalyst until a substantial polymerization of the monomer occurs.

3,993,590
PROCESS FOR PREPARING SPHEROIDAL SILICO-ALUMINA PARTICLES

Jacques Maurice Jules Ghislain André; Raymond Marc Cahen, both of Brussels; Henri Robert Debus, Meise; Rene Odon Lammers, Brussels, and Hugo Johannes Van Thillo, Grimbergen, all of Belgium, assignors to Labofina S.A., Brussels, Belgium

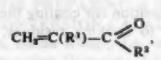
Filed Feb. 10, 1975, Ser. No. 548,184

Claims priority, application Luxembourg, Feb. 18, 1974, 69405

Int. Cl.² B01J *37/00*

U.S. Cl. 252—430 **12 Claims**

1. A process for preparing silica-alumina beads containing silica and at least an equal amount of alumina comprising dispersing as droplets into a hot and practically water-immiscible fluid, an aqueous mixture which comprises finely divided alumina hydrogel, alumina hydrosol as alumina precursors, the weight ratio of said hydrogel to said hydrosol being between 99:1 and 50:50, an alkali silicate and silica gel as silica precursors, the amount of alkali silicate, based on SiO_2, not exceeding 20% of the total weight of SiO_2 and Al_2O_3, and the total amount of alkali silicate and silica gel, based on SiO_2, not exceeding 50% of the total weight of SiO_2 and Al_2O_3 and a water-soluble monomer whose cross-linked polymer is water soluble or forms a gel, said monomer being an acrylic compound of the general formula



wherein R^1 is H or the methylradical and R^2 is a — OR^3 or $-NR^3R^4$ radical with R^3 and R^4 in such radical being H or a hydrophilic radical, the amount of said monomer being between 5% and 100% of the weight of alumina dnd silica precursors, based on their oxides, and maintaining the droplets of the aqueous mixture in the hot fluid under polymerization conditions until substantial polymerization of said monomer occurs.

3,993,591
OXIDATIVE DEHYDROGENATION PROCESS

Robert S. Cichowski, San Luis Obispo, Calif., and Floyd E. Farha, Jr., Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 264,932, June 21, 1972, Pat. No. 3,870,764. This application Jan. 17, 1975, Ser. No. 542,006

Int. Cl.² B01J *21/02*, *27/18*

U.S. Cl. 252—432 **29 Claims**

1. A catalyst composition consisting essentially of (I) about 15 to 45 weight percent iron, (II) about 15 to 40 weight percent phosphorus, (III) about 0.1 to 10 weight percent of a promoter which is at least one Group IIIA component which is boron, gallium, indium, or thallium, and (IV) oxygen, wherein the weight percents are based on the total composition exclusive of support, if any.

3,993,592
PROCESS FOR PREPARING CATALYSTS FOR THE HYDROTREATING OF PETROLEUM FRACTIONS

Hugo Johannes Van Thillo, Grimbergen; René Odon Lammers, Brussels; Henri Robert Debus, Meise; Raymond Marc Cahen, and Jacques Maurice Jules Ghislain André, both of Brussels, all of Belgium, assignors to Labofina S.A., Brussels, Belgium

Filed Feb. 10, 1975, Ser. No. 548,211

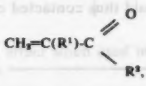
Claims priority, application Luxembourg, Feb. 18, 1974, 69409

Int. Cl.² B01J *27/04*, *21/04*, *23/84*

U.S. Cl. 252—439 **10 Claims**

1. A process for producing catalysts for hydrotreating petroleum fractions, said catalysts containing, after thermal treatment, at least an oxide or a sulphide of a Group VIII metal and at least an oxide or a sulphide of a Group VI B metal and an alumina support, said process comprising

preparing said catalyst in the form of beads by agglomeration of alumina by polymerizing, in a hot substantially water-immiscible fluid medium, an aqueous mixture consisting essentially of about 5–30% by weight of alumina hydrogel based on alumina and about 0.25–20% by weight of a water-soluble acrylic monomer which is polymerizable to an uncrossed-linked water-soluble polymer or an uncrossed-linked gel polymer, said acrylic monomer being of the formula



wherein R^1 is selected from a group consisting of —H and $—CH_3$ and R^2 is selected from the group consisting of $—OR^3$ and $—NR^3R^4$, wherein R^3 and R^4 are selected from the group consisting of —H and a hydrophylic radical;

dispersing said aaqueous mixture in the form of droplets into said fluid medium to effect polymerization of the monomer;

recovering the polymerized beads dispersed in said fluid medium; and

subjecting said beads to drying and calcining thermal treatment wherein said oxide or sulphide is introduced into said beads prior to said thermal treatment.

3,993,593
CATALYSTS FOR THE PRODUCTION OF CARBONYL COMPOUNDS

Katsumi Kaneko, and Toshio Hoshino, both of Saitama, assignors to Ton Nenryo Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 12, 1973, Ser. No. 414,777

Claims priority, application Japan, Nov. 22, 1972, 47-116566

Int. Cl.² B01J *27/06*, *29/00*, *23/08*

U.S. Cl. 252—441 **7 Claims**

1. A process for the preparation of a catalyst composition useful for the production of carbonyl compounds by reacting olefins with oxygen in the presence of steam, which process consists essentially of calcining at a temperature of 200° to 400° C. a catalyst composition comprising palladium and/or palladium compounds, copper chloride and a carrier selected from the group consisting of silica, alumina and silica-alumina and, without a hydrogenation step, recovering an oxidation catalyst product.

4. A process for the preparation of a catalyst composition useful for the production of carbonyl compounds by reacting olefins with oxygen in the presence of steam which process consists essentially of calcining at a temperature of 200° to 400° C. a catalyst composition comprising palladium and/or palladium compounds, copper chloride, one or more compounds selected from the group consisting of silver, cerium and vanadium compounds and a carrier selected from the group consisting of silica, alumina and silica-alumina and, without a hydrogenation step, recovering an oxidation catalyst product.

3,993,594
ACTIVATING GROUP VIII METAL/ALUMINA CATALYSTS WITH HALOSILANE

John W. Myers, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Feb. 3, 1975, Ser. No. 546,819

Int. Cl.² B01J *27/08*, *27/10*

U.S. Cl. 252—442 **32 Claims**

1. A method for activating an alumina supported Pt, Ir, Os, Ru, Rh or Pd metal catalyst which comprises:

heating said catalyst to a temperature of greater than 1200° F in an atmosphere selected from the group consisting of nitrogen, hydrogen, and mixtures of nitrogen and hydrogen;

holding the thus treated catalyst at said temperature of greater than 1200° F for at least 10 minutes and contacting said catalyst at said temperature of greater than 1200° F with a dry activating gas comprising a halosilane selected from the group consisting of chlorosilanes and bromosilanes for a time sufficient to impart a halide content to the catalyst and to increase the activity of the catalyst, said contacting being carried out in the absence of air; and

thereafter cooling said thus contacted catalyst.

3,993,595
ACTIVATED ALUMINUM AND METHOD OF PREPARATION THEREOF

George G. Merkl, 46 Sunset Court, Haworth, N.J. 07641

Continuation-in-part of Ser. No. 211,979, Dec. 27, 1971, abandoned. This application Aug. 15, 1974, Ser. No. 497,560

Int. Cl.² B01J 21/04

U.S. Cl. 252—463 15 Claims

1. A method of preparing a reactive aluminum which comprises:

contacting at a temperature not in excess of 200° F

a. aluminum metal, characterized by

i. a purity of at least about 99.99% by weight;

ii. a long dimention of not below about 1/32 inch; and

iii. a short dimension of not below about 1/64 inch; with

b. a liquid metal selected from mercury, gallium and gallium/indium alloys;

in the presence of

c. a liquid source of hydrogen ions selected from aqueous acid solutions and aqueous alkaline solutions covering said aluminum metal,

whereby said liquid metal (b) permeates said aluminum (a) forming a reactive aluminum.

3,993,596
PREPARATION OF SPHEROIDAL ALUMINA PARTICLES

Jacques Maurice Jules Ghislain André; Raymond Marc Cahen, both of Brussels; Henri Robert Debus, Meise; Rene Odon Lammers, Brussels, and Hugo Johannes Van Thillo, Grimbergen, all of Belgium, assignors to Labofina S.A., Brussels, Belgium

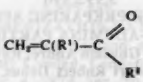
Filed Feb. 10, 1975, Ser. No. 548,192

Claims priority, application Luxembourg, Feb. 18, 1974, 69406

Int. Cl.² B01J 37/00

U.S. Cl. 252—448 9 Claims

1. A process for preparing catalysts in the form of beads comprising at least a catalytic agent and an alumina carrier, said process comprising dispersing as droplets in a hot and substantially water-immiscible fluid, an aqueous mixture which comprises finely divided alumina hydrogel, alumina hydrosol, the alumina hydrogel and hydrosol being in a weight ratio of alumina hydrogel to alumina hydrosol (based on Al_2O_3) of between 99:1 and 50:50, and 0.05 to 35% by weight of a compound capable of generating a catalytic agent by thermal or chemical treatment and 0.25 to 20% by weight of a water soluble monomer whose uncross-linked polymer is water soluble or forms a gel, said monomer comprising an acrylic compound of the general formula:



wherein, R^1 is selected from the group consisting of H and a methyl radical, R^2 is selected from the group consisting of the $-OR^3$, and $-MR^3R^4$ radicals wherein R^3 and R^4 are selected from the group consisting of H and a hydrophilic radical, such aqueous mixture including said monomer, being dispersed as droplets into the hot fluid, carrying out polymerization of said droplets in said hot fluid employing thermal polymerization techniques or free radical catalytic polymerization techniques until said polymerization is substantially complete, recovering beads from said water immiscible fluid and drying and calcining said beads.

3,993,597
CATALYTIC COATING COMPOSITION FOR COOKING DEVICES

Alvin Barber Stiles, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 472,423, May 22, 1974, abandoned. This application Feb. 26, 1975, Ser. No. 553,425

Int. Cl.² B01J 29/00, 29/10, 29/20

U.S. Cl. 252—454 26 Claims

1. A catalyst composition for coating the surfaces of cooking devices exposed to cooking residues, said composition containing

1. from about 10–94% by weight of a catalytic metal oxide selected from the group consisting of the oxides of cobalt, chromium, iron, nickel, manganese, copper, zinc, the rare earths and mixtures thereof in the form of particles having a size of less than 35 microns and a surface area of about 5–150 square meters per gram with the proviso that when the oxide is manganese oxide, from 0–80% by weight of said oxide can have a surface area in excess of about 150 square meters per gram;

2. at least 1% by weight on a dry basis of an alkaline silicate selected from the group consisting of sodium silicate, lithium silicate, potassium silicate, silicates of organic bases having a basic dissociation constant greater than 10^{-3} and mixtures thereof, said alkaline silicate being in the form of an aqueous solution; and

3. from about 0–20% by weight of a carbonate or hydroxide of one or more metals of said catalytic metal oxides when the catalytic metal oxide of (1) is manganese oxide and from about 1–20% by weight of said carbonate or hydroxide when the catalytic metal oxide of (1) is other than manganese oxide.

3,993,598
PROCESS FOR PREPARING A HEAVY CRUDE CONVERSION CATALYST

William F. Arey, Jr.; Glen P. Hamner, and Willard H. Sawyer, all of Baton Rouge, La., assignors to Exxon Research and Engineering Company, Linden, N.J.

Continuation-in-part of Ser. No. 440,290, Feb. 7, 1974, abandoned. This application Dec. 16, 1974, Ser. No. 533,300

Int. Cl.² B01J 21/04, 23/10, 23/84

U.S. Cl. 252—462 31 Claims

1. A process for the synthesis and preparation of a catalyst, having a relatively high concentration of pores of uniformly large diameter, high surface area and pore volume comprising

dispersing a compound of a Group VIB or Group VIII metal, or both, said compound being thermally decomposable to form a metal oxide, and an aluminum halide salt in an aqueous or alcohol medium in molar ratio of water :aluminum halide or alcohol:aluminum halide ranging from about 15:1 to about 30:1 and, while maintaining the temperature within a range of from about 30° F. to about 100° F., adding olefin oxide in molar ratio of olefin

oxide:halide of from about 1.5:1 to about 2.0:1 while maintaining a pH in the range of from about 5–8 to effect removal of the halide from solution and form a sol,

raising the temperature of the solution to substantially ambient temperature or higher to form a cogel which separates from its syneresis liquid,

aging the cogel while in contact with syneresis liquid for a period of at least 6 hours,

separating the cogel from the syneresis liquid, and then washing,

drying,

calcining to form a catalyst,

dispersing a soluble salt of a Group IVA metal

in an aqueous of alcohol medium, in amount sufficient to provide from about 0.1 to about 10 percent of the Group IVA metal, measured as its oxide, in the final catalyst, impregnating said catalyst which contains the Group VIB or Group VIII metal hydrogenation component, or both, with aqueous or alcohol medium containing said Group IVA salt,

drying,

calcining, and

the recovering the catalyst.

3,993,599
PROCESS FOR PREPARING A HEAVY CRUDE CONVERSION CATALYST

William J. Mattox, Baton Rouge, La., assignor to Exxon Research and Engineering Company, Linden, N.J.

Continuation-in-part of Ser. No. 440,316, Feb. 7, 1974, abandoned. This application Dec. 16, 1974, Ser. No. 533,312

Int. Cl.² B01J *21/04, 23/10, 23/84*

U.S. Cl. 252—462 **30 Claims**

1. A process for the synthesis and preparation of a catalyst support having a relatively high concentration of pores of uniformly large diameter, high surface area and pore volume comprising

dispersing an aluminum halide salt in an aqueous or alcohol medium in molar ratio of water:aluminum halide or alcohol:aluminum halide ranging from about 15:1 to about 30:1 and, while maintaining the temperature within a range of from about 30° F. to about 100° F., adding olefin oxide in molar ratio of olefin oxide:halide of from about 1.5:1 to about 2.0:1 while maintaining a pH in the range of from about 5—8 to effect removal of the halide from solution and form a sol,

raising the temperature of the solution to substantially ambient temperature or higher to form a gel which separates from its syneresis liquid,

aging the gel while in contact with syneresis liquid for a period of at least 6 hours,

separating the gel from the syneresis liquid, and then washing, drying, calcining, and then recovering a product.

3,993,600
CATALYST SUPPORT ASSEMBLY

James B. Hunter, Newton Square, Pa., assignor to Matthey Bishop, Inc., Malvern, Pa.

Continuation-in-part of Ser. No. 383,103, Aug. 23, 1973, Pat. No. 3,881,877, which is a continuation-in-part of Ser. No. 186,630, Oct. 5, 1971, Pat. No. 3,776,701. This application Apr. 17, 1975, Ser. No. 568,943

The portion of the term of this patent subsequent to Dec. 4, 1990, has been disclaimed.

Int. Cl.² B01J *23/16, 23/42, 35/04*

U.S. Cl. 252—465 **4 Claims**

1. In combination, a catalyst supporting structure comprising a plurality of woven screens in a stacked relationship, the screens being composed of an alloy consisting essentially of 4–6% aluminum, 20–30% chromium, 0.25–1% cobalt and balance essentially iron, and a plurality of precious metal catalyst gauzes supported on said structure, said alloy demonstrating a catalytic effect when used in said combination for ammonia oxidation.

3,993,601
PROCESS FOR PREPARING A HEAVY CRUDE CONVERSION CATALYST

Fred M. Long, and Willard H. Sawyer, both of Baton Rouge, La., assignors to Exxon Research and Engineering Company, Linden, N.J.

Continuation-in-part of Ser. No. 440,302, Feb. 7, 1974, abandoned. This application Dec. 16, 1974, Ser. No. 533,313

Int. Cl.² B01J *21/04, 23/10, 23/84*

U.S. Cl. 252—462 **19 Claims**

1. A process for the synthesis and preparation of a catalyst support having a relatively high concentration of pores of uniformly large diameter, high surface area and pore volume comprising

dispersing an aluminum halide salt in an aqueous or alcohol medium in molar ratio of water:aluminum halide or alcohol:aluminum halide ranging from about 15:1 to about 30:1 and, while maintaining the temperature within a range of from about 30° F. to about 100° F., adding olefin oxide in molar ratio of olefin oxide:halide of from about 1.5:1 to about 2.0:1 while maintaining a pH in the range of from about 5–8 to effect removal of the halide from solution and form a sol,

introducing the sol into a mineral oil in volume ratio of mineral oil:sol of from about 5:1 to about 20:1, and, while maintaining a temperature ranging from about 75° F. to about 150° F., agitating sufficiently to form spheres which are transformed from sol into gel,

aging the gel spheres while in contact with syneresis liquid for a period sufficient to increase the strength of the gel without significant adverse shrinkage of the size of the pores developed in the gel

washing,

drying,

calcining, and

then recovering a product comprising particles ranging about ⅛ inch average particle size diameter, and smaller.

3,993,602
POLYCRYSTALLINE SILICON CARBIDE WITH INCREASED CONDUCTIVITY

Svante Prochazka, Ballston Lake, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Nov. 17, 1975, Ser. No. 632,495

Int. Cl.² H01B *1/04*

U.S. Cl. 252—504 **4 Claims**

1. A method of producing an electrically conducting polycrystalline silicon carbide body which comprises providing a significantly uniform mixture of a submicron powder consisting essentially of β-silicon carbide, an amount of boron additive selected from the group consisting of boron and boron carbide equivalent to about 0.3% by weight to 3.0% by weight of boron based on said β-silicon carbide, about 0.1% by weight to 1.5% by weight of beryllium carbide based on said β-silicon carbide, and an amount of a carbonaceous additive

selected from the group consisting of free carbon and a carbonaceous organic material equivalent to 0.1% by weight to 1.0% by weight of free carbon based on said β-silicon carbide, said carbonaceous organic material completely decomposing at a temperature ranging from about 50° C to 1000° C to yield said free carbon and gaseous product of decomposition, shaping the mixture into a green body, and sintering the green body at a temperature ranging from about 1850° C to 2300° C in a sintering atmosphere in which it is substantially inert at atmospheric pressure or below atmospheric pressure to produce a sintered body having a density of at least 85% of the theoretical density of silicon carbide.

3,993,603

COMPOSITION FOR VO_2 INCANDESCENT LAMP CURRENT INRUSH LIMITERS

Philip J. Nalepa, Greensburg; Peter R. Emtage, and Robert C. Miller, both of Pittsburgh, all of Pa., assignors to Westinghouse Electric Corporation, Pittsburgh, Pa.

Filed June 10, 1975, Ser. No. 585,731

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 3, 1976

Int. Cl.² H01B *1/08*

U.S. Cl. 252—518 **2 Claims**

1. An improved composition of vanadium oxide current inrush limiting ceramic for incandescent lamps, said ceramic being of the type electrically connected in series with an incandescible lamp filament and comprising vanadium oxide having a composite formula V_xO_x, where x is less than 4.5 and greater than 3.5; wherein said improvement comprises doping said ceramic with 0.003–0.06 weight percent of MoO_3.

3,993,604

ALICYCLIC COMPOUNDS, THEIR USE AND PROCESS FOR PREPARING SAME

Alan Francis Thomas, Geneva, and Günther Ohloff, Bernex, Geneva, both of Switzerland, assignors to Firmenich S.A., Geneva, Switzerland

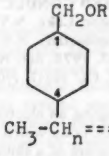
Filed May 21, 1974, Ser. No. 471,839

Claims priority, application Switzerland, June 7, 1973, 8248/73

Int. Cl.² A61K *7/46;* **C11B** *9/00*

U.S. Cl. 252—522 **6 Claims**

1. A process for improving, enhancing or modifying the organoleptic properties of perfumes, perfumed products, natural or artificial essential oils which comprises adding thereto a small but effective amount of at least one compound of formula



Ib

possessing a single or a double bond in the position indicated by the dotted line, and wherein the index n stands for the integers zero or one, and the symbol R represents a hydrogen atom, an alkyl or an acyl radial containing from 1 to 6 carbon atoms.

3,993,605

FOAM INHIBITED OR ATTENUATED WASHING, CLEANING AND RINSING AGENTS FOR DISHES AND UTENSILS

Sigrid Scholz-Weigl, Marl, and Ferdinand von Praun, Lippramsford-Freiheit, both of Germany, assignors to Chemische Werke Huls Aktiengesellschaft

Filed June 2, 1975, Ser. No. 582,795

Claims priority, application Germany, June 5, 1974, 2427125

Int. Cl.² C11D *3/20, 1/83*

U.S. Cl. 252—550 **9 Claims**

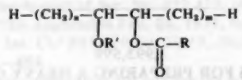
1. A foam controlled washing and cleaning composition or dishwashing composition consisting essentially of

A.

5 – 35 percent by weight of anionic detergents
0 – 20 percent by weight of nononic detergents
5 – 70 percent by weight of builders

B.

20 – 70 percent by weight based on said anionic and nonionic detergents of a vicinal alkanediol monoester and/or diester of the formula:



as foam controlling agent, where R is hydrogen, linear or branched alkyl of one to twelve carbon atoms or phenyl; R′ is hydrogen or

n is zero or an integer from 1 to 28;
m is zero or an integer from 1 to 28; and
$n + m$ is an integer from 10 to 30.

3,993,606

PROCESS FOR THE PRODUCTION OF POLYURETHANE FOAMS

Wulf von Bonin; Helmut Kleimann; Armand de Montigny, and Jozsef Ivanyi, all of Leverkusen, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

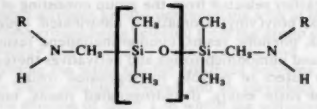
Filed Nov. 6, 1974, Ser. No. 521,424

Claims priority, application Germany, June 6, 1974, 2427273

Int. Cl.² C08G *18/14, 18/32, 5/54*

U.S. Cl. 260—2.5 AH **3 Claims**

1. In a process for producing a foam plastic which readily separates from the mold in which it had been found wherein a foamable reaction mixture contains an organic polyisocyanate, an organic compound having a molecular weight of about 62 to about 10,000 which contain reactive hydrogen atoms, a catalyst for the isocyanate - reactive hydrogen reaction and a blowing agent; is charged to the mold and reacted, the improvement which comprises including in the reaction mixture salts of polysiloxanes which contain amino groups of the formula



wherein

n is an integer from 4 to 20 and

R stands for aliphatic hydrocarbon radical having 1 to 4 carbon atoms or a cyclohexyl radical; and fatty acids with more than 7 carbon atoms to improve the mold release properties of the resulting molded product, 50 – 200 mol % of fatty acid being used per mol of amino groups.

3,993,607

SMOKE-SUPPRESSANT AND FIRE-RETARDANT POLY(VINYL CHLORIDE) COMPOSITIONS

David M. Florence, Lancaster, Pa., assignor to Armstrong Cork Company, Lancaster, Pa.

Continuation of Ser. No. 312,740, Dec. 6, 1972, abandoned. This application May 9, 1974, Ser. No. 468,490

Int. Cl.² C08K *3/26, 3/22;* C08J *9/36*

U.S. Cl. 260—2.5 FP **4 Claims**

1. A resin composition containing a poly(vinyl chloride) homopolymer or copolymer, wherein the copolymer contains a major portion of vinyl chloride and, as a smoke suppressant and fire retardant, between about 5.0 and 75 parts by weight Fe_2O_3 and between about 5.0 and 200 parts by weight of a hydrated magnesium carbonate containing a high degree of hydration per one hundred parts resin.

3,993,608

POLY(URETHANE-ISOCYANURATE) FOAMS CONTAINING HOLLOW GLASS SPHERES

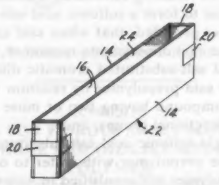
James N. Wells, Cottage Grove, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed June 27, 1974, Ser. No. 483,762

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 10, 1976

Int. Cl.² C08G *18/14;* B32B *27/40;* C09K *3/00*

U.S. Cl. 260—2.5 AW **12 Claims**



1. A poly(urethane-isocyanurate) foam comprising a continuous matrix of a reaction product and, within said matrix, a discontinuous phase of hollow glass spheres having an average diameter of 5 to 500 microns, said reaction product being formed by the reaction of organic polyisocyanate and organic polyol in the presence of foam stabilizer, isocyanate trimerization catalyst and blowing agent, the NCO/OH equivalent ratio being 1.2/1 to 2.5/1, and the average molecular weight of the polyol being in the range of 600 to 1500, said foam stabilizer comprising a fluorochemical having the formula $(R_f)_m Q_z(H)_n$ wherein R_f is a fluorinated, monovalent, aliphatic radical, H is an active hydrogen atom, Q is a linkage free of active hydrogen atoms having a valence equal to $m+n$, m is an integer of at least 1, n is an integer of at least 2, and z is an integer of from 1 to 3, said polymeric reaction product having isocyanate-derived linkages consisting essentially of isocyanurate and urethane linkages; wherein the crosslink density of said reaction product is in the range of about one crosslink per 400 to 800 atomic weight units; wherein said glass spheres are 2 to 20 percent by volume of said foam; and wherein said foam has a density in the range of 10 to 20 pounds per cubic foot; and wherein said foam exhibits a beam flexural modulus at least as great as that calculated from the formula $Log_{10}F=(0.05229)D+4.9542$ wherein F is the beam flexural modulus in pounds per square inch and D is the density of the foam in pounds per cubic foot.

3,993,609

PROCESS FOR PREPARING FOAMED STRUCTURES

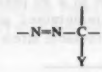
Ernest Rudolph Kamens, Tonawanda; Donald Milton Kressin, Getzville; Harold Carl Lange, Grand Island, and Ronald Edward MacLeay, Williamsville, all of N.Y., assignors to Pennwalt Corporation, Philadelphia, Pa.

Continuation-in-part of Ser. No. 453,446, March 21, 1974, abandoned. This application Feb. 11, 1975, Ser. No. 548,946

Int. Cl.² C08J *9/02*

U.S. Cl. 260—2.5 R **31 Claims**

1. A process for preparing cellular polymeric structures which comprises mixing an acidulous or acidic polymerizable medium that is polymerizable and/or cross-linkable by a free radical mechanism with an effective amount of an acid sensitive mono- or poly-azo compound containing the group:



FORMULA I

wherein Y is an acid sensitive group which in the presence of an acidulous or acidic polymerizable medium causes sufficient decomposition of the azo compound that gas is released in said medium and during said decomposition said mono- or poly- azo compound promotes polymerization and/or cross-linking of said medium to provide a matrix that is sufficiently polymerized and/or cross-linked that the generated gases cause the matrix to expand, each of the remaining valences being satisfied by an organic radical; provided that any carbon atom that is directly linked to an azo nitrogen, except that of a carbonyl group, has at least two of its remaining three valences satisfied by a carbon to carbon bond or a carbon to hydrogen bond.

3,993,610

POLYURETHANE FOAM

Wilhelm J. Schnabel, and Maurice C. Raes, both of Branford, Conn., assignors to Olin Corporation, New Haven, Conn.

Continuation-in-part of Ser. No. 416,042, Nov. 15, 1973, Pat. No. 3,878,235. This application Apr. 7, 1975, Ser. No. 565,490

The portion of the term of this patent subsequent to Apr. 15, 1992, has been disclaimed.

Int. Cl.² C08G *18/06, 18/14*

U.S. Cl. 260—2.5 AT **14 Claims**

1. A process for preparing a polyurethane foam from a reaction mixture having from about 0.7 to about 1.25 NCO groups per each OH group, said mixture being comprised of a polyol, a foaming agent, a reaction catalyst and a chlorine-containing methylene-bridged diaryl diisocyanate selected from ortho-chlorobenzyl-toluene diisocyanate and dichlorobenzyl-toluene diisocyanate.

3,993,611

ZINC CHLORIDE RESISTANT NYLON

Willard M. Sims, Leominster, and Arthur D. Bliss, Harvard, both of Mass., assignors to Foster Grant Co., Inc., Leominster, Mass.

Continuation-in-part of Ser. No. 393,549, Aug. 31, 1973, abandoned, which is a continuation-in-part of Ser. No. 147,694, May 27, 1971, abandoned. This application Apr. 17, 1975, Ser. No. 568,955

Int. Cl.[2] C08G *69/02*

U.S. Cl. 260—18 N 14 Claims

1. A polyamide composition characterized by improved resistance to the stress cracking effect of an aqueous metallic halide solution; said composition comprising the product prepared by the process of copolymerizing a mixture of a saturated aliphatic diamine having the formula: $NH_2 - R' - NH_2$, a saturated aliphatic dicarboxylic acid having the formula HOOC—R—COOH, wherein said R' and R are saturated hydrocarbon radicals containing from about 25 to about 50 carbon atoms, said aliphatic diamine and said aliphatic dicarboxylic acid being present in approximately equal molar quantities in an amount of from about 0.5 percent to about 15 percent by weight and from about 85 percent to 99.5 percent by weight of a polyamide producing monomer, said polyamide producing monomer being selected from the group consisting of those amino acids, amino acid anhydrides, diamines, dicarboxylic acids, lactams and mixtures thereof having 9 or less in-chain carbon atoms; recovering said composition and then contacting said composition with said aqueous metallic halide solution without substantial exposure of said composition to atmospheric humidity prior to said contact whereby said composition will withstand immersion in a 50 percent by weight aqueous zinc chloride solution maintained at 73° F. for a period of 200 hours without appreciable stress cracking.

3,993,612

AQUEOUS COATING COMPOSITION

Tetsuo Aihara; Tadashi Watanabe; Yasuharu Nakayama; Yoshio Yamashita, and Isao Toyomoto, all of Hiratsuka, Japan, assignors to Kansai Paint Company, Ltd., Japan

Filed Mar. 19, 1975, Ser. No. 559,770

Claims priority, application Japan, Mar. 28, 1974, 49-34961

Int. Cl.[2] C08L *91/00*

U.S. Cl. 260—23.7 A 13 Claims

1. In an aqueous coating compositon comprising a vinyl polymer emulsion prepared by subjecting a vinyl monomer to emulsion polymerization in an aqueous medium in the presence of maleinized polybutadiene used as a dispersion stabilizer, an improvement which is characterized in that at least one copolymer is further incorporated, said copolymer being composed of (A) at least one monomer prepared by reacting one glycidyl ester of acrylic acid and methacrylic acid with at least one fatty acid of drying oil fatty acid and semi-drying oil fatty acid, (B) at least one α,β-ethylenically unsaturated acid and (C) at least one unsaturated monomer containing substantially no carboxyl group and having a Q value of at least 0.1 as determined by Q-e theory.

3,993,613

ADHESIVE COMPOSITION

Richard C. Doss, and Lawrence D. Jurrens, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Feb. 24, 1975, Ser. No. 552,336

Int. Cl.[2] C08L *93/10*

U.S. Cl. 260—27 R 9 Claims

1. An adhesive composition consisting essentially of

a. a rubbery, radial teleblock copolymer of a conjugated alkadiene having 4 to about 12 carbon atoms and a vinyl-substituted aromatic monomer having 8 to about 18 carbon atoms,

b. a tackifier selected from the group consisting of polyterpenes, poly(vinyl aromatics), chlorinated hydrocarbon resins, phenolic resins, coumarone/indene resins, modified and unmodified rosins and derivatives thereof, rosin, rosin esters of polyols, hydrogenated rosins, hydrogenated rosin esters, dehydrogenated rosins, methylated rosin esters and mixtures thereof, and

c. a tackifier modifier being a polyalkene selected from the group consisting of homopolymers and copolymers of alkene having 2 to about 8 carbon atoms per molecule and mixtures of said polymers, said polyalkene having a weight average molecular weight in the range of about 200 to about 3,000.

3,993,614

SULFONATED AROMATIC POLYISOCYANATES AND PREPARATION OF STABLE ANIONIC POLYURETHANE OR POLYUREA LATICES THEREFOR

Robert C. Carlson, Hastings, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Division of Ser. No. 841,570, July 14, 1969, abandoned, which is a continuation-in-part of Ser. No. 749,573, Aug. 2, 1968, abandoned. This application Nov. 9, 1973, Ser. No. 414,266

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 10, 1976

Int. Cl.[2] C08J *3/00*

U.S. Cl. 260—29.2 TN 13 Claims

1. A method of making a self-emulsified aqueous polyurethane latex comprising

a. reacting an aromatic polyisocyanate with a sulfonating agent, said aromatic polyisocyanate selected from the group consisting of an aromatic diisocyanate monomer having a molecular weight of at least 160, and an isocyanate-terminated prepolymer having a molecular weight of less than about 25,000, and said sulfonating agent selected from the group consisting of H_2SO_4, SO_3, $ClSO_3H$, and mixtures thereof, the number of moles of said sulfonating agent being less than the number of moles of said aromatic polyisocyanate and the ratio of the number of moles of said sulfonating agent to the numerical difference between the moles of said aromatic polyisocyanate and the moles of said sulfonating agent being 0.02:1 to 0.5:1;

b. reacting the resulting sulfonated aromatic polyisocyanate with a base to form a sulfonic acid salt-substituted polyisocyanate; provided, that when said aromatic diisocyanate is the said diisocyanate monomer, the resulting sulfonic acid salt-substituted aromatic diisocyanate is converted to said prepolymer by reaction with a polyoxyalkylene compound having two or more active hydrogen-bearing functional groups; and

c. mixing said sulfonic acid salt-substituted aromatic polyisocyanate prepolymer with water to obtain a chain extended polymer self-emulsified in water.

3,993,615

PROCESS AND COMPOSITION FOR BREAKING EMULSIONS

Sheldon B. Markofsky, Olney, and Louis L. Wood, Rockville, both of Md., assignors to W. R. Grace & Co., New York, N.Y.

Filed Dec. 10, 1973, Ser. No. 423,503

The portion of the term of this patent subsequent to July 1, 1992, has been disclaimed.

Int. Cl.[2] C08F *18/24;* C08G *18/12;* C08J *3/00*

U.S. Cl. 260—29.2 TN 28 Claims

1. A process for preparing a water soluble alkylated polyurea comprising:

a. preparing a water soluble polyurea having at least 1 amino group per molecule by admixing and reacting in a liquid solvent consisting essentially of a ketone or an aldehyde having at least 2 carbon atoms per molecule: (i) a polyisocyanate; and (ii) a polyamine having at least 3

amino nitrogen groups per molecule with at least 2 of the amino groups being selected from the group consisting of primary and secondary amino groups; and

b. forming the water soluble alkylated polyurea by reacting the water soluble polyurea and an alkylating agent.

2. The process of claim 1 in which the polyurea is reacted with the alkylating agent in an aqueous medium.

3,993,616

ALKALI METAL CARBOXYLIC POLYELECTROLYTE SOLUTIONS WITH N-METHYLOL CROSSLINKER

James Richard Gross, Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Filed Aug. 5, 1974, Ser. No. 494,692

Int. Cl.² C08L *33/02;* **A61L** *15/00*

U.S. Cl. 260—29.4 UA **10 Claims**

1. A solution having a pH from about 1.0 to about 6.5 and useful to form water swellable articles of a carboxylic synthetic polyelectrolyte which comprises

1. a solvent consisting of water, lower alcohols, or mixtures thereof,
2. about 5 to about 60% by weight based on the amount of solvent of an alkali metal carboxylic polyelectrolyte or mixtures thereof, and
3. .05 to 5.0% by weight based on the polyelectrolyte of a poly N-methylol or poly N-alkoxymethyl crosslinking agent reactive with free carboxylic acid groups.

3,993,617

ANTIFUNGAL 2-SUBSTITUTED PHTHALIMIDINES

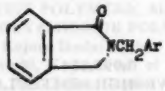
Thomas James Schwan, Norwich, N.Y., assignor to Morton-Norwich Products, Inc., Norwich, N.Y.

Filed Oct. 30, 1975, Ser. No. 627,229

Int. Cl.² C07D *209/46*

U.S. Cl. 260—325 PH **3 Claims**

1. A compound of the formula:



wherein Ar is 3,4-dichlorophenyl or 2-naphthyl.

3,993,618

COATINGS FOR FIBROUS SHEET MATERIAL OF POLYURETHANE AND OIL-LIKE HYDROCARBON POLYMER

Eduard Muck, Otrokovice, Czechoslovakia; Jaroslav Strachota, deceased, late of Veselinad Moravou, Czechoslovakia, by Vera Strachotova, legal representative; Petr Hlozek, Veseli nad Moravou, and Josef Horak, Gottwaldov, both of Czechoslovakia, assignors to Statni vyzkumny ustav kozedelny, Gottwaldov, Czechoslovakia

Continuation of Ser. No. 177,500, Sept. 7, 1971, abandoned. This application Jan. 30, 1974, Ser. No. 438,009

Int. Cl.² C08K *5/01*

U.S. Cl. 260—33.6 UB **21 Claims**

1. A coating composition consisting essentially of 0.2 to 20 parts by weight of an oil-like homopolymer formed from a lower olefinic monomer containing 2 to 4 carbon atoms and a mixture of 100 parts by weight, on a dry basis of a thermoplastic polyester-urethane or polyether urethane elastomer produced from the reactive product of hydroxyl poly(tetramethylene oxide), butane diol-1,4, and diphenyl methane p,p'-diisocyanate and 0 to 20 parts by weight of a oil-like copolymer selected from the group consisting of (1) copolymeric material formed from (a) an olefin having 2 to 4 carbon atoms and (b) an olefin having the formula:

(I)

wherein R is selected from the group consisting of linear or branched chain alkyl radicals containing about 4 to about 20 carbon atoms in the carbon chain and carbo-cyclic radicals selected from the group consisting of aromatic-cyclic radicals containing one to two benzene rings, and cycloaliphatic carbo-cyclic radicals containing from about 2 to about 12 carbon atoms in their chain, and (2) mixtures of (1).

3,993,619

PROCESS FOR DYEING POLYURETHANE RESINS

Winfried Kruckenberg; Konrad Nonn, both of Leverkusen; Georg Pape, Opladen, and Michael Kressner, Odenthal, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

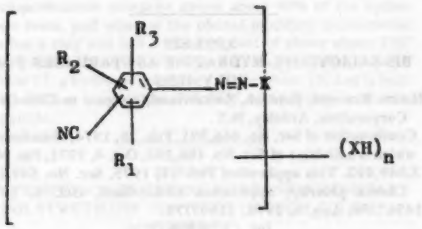
Filed May 22, 1975, Ser. No. 580,035

Claims priority, application Germany, May 29, 1974, 2426172

Int. Cl.² C08G *18/32;* **C08K** *5/23*

U.S. Cl. 260—37 N **5 Claims**

1. Process for dyeing polyurethane resins with dyes which can be built into the resins to form covalent bonds, characterised in that dyes of the formula:



wherein:

R_1 denotes cyano, halogen, alkoxy, alkylsulphonyl, arylsulphonyl, optionally mono or disubstituted carbamoyl or optionally mono- or disubstituted sulphamoyl,

R_2 denotes hydrogen, cyano, carboxyl, halogen, alkoxy, alkyl, alkylsulphonyl or arylsulphonyl,

R_3 denotes hydrogen cyano, halogen or alkyl,

K denotes the residue of a coupling component of the arylamine series,

X denotes O, NH or N—C_1–C_4-alkyl and

n denotes an integer of from 1 to 4,

the XH groups being attached to one or more substituents R_1, R_2, R_3, or to a substituent of the coupling component are added to the reaction mixture or to one of the components before or during the polyaddition reaction.

3,993,620

POWDERED FACING AGENT

Akio Yamanishi, Neyagawa, and Tetsuya Imazato, Kyoto, Japan, assignors to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

Filed May 28, 1974, Ser. No. 473,894

Claims priority, application Japan, May 29, 1973, 48-59362

Int. Cl.² C04B 35/68; C08K 3/34; C08L 61/06

U.S. Cl. 260—38 **3 Claims**

1. A powdered facing agent for use in forming a shell mold and consisting essentially of a powdered refractory, a novolak type phenol resin and a resol type phenol resin; the ratio of said novolak type phenol resin to said resol type phenol resin being in the range of 90 to 40 parts, by weight, novolak type phenol resin to 10 to 60 parts, by weight, resol type phenol resin; and the total parts by weight of said novolak type phenol resin and resol type phenol resin in said facing agent being 20 to 30 parts per 100 parts of said powdery refractory.

3,993,621

REINFORCED STYRENE ACRYLONITRILE COPOLYMER HAVING IMPROVED TEMPERATURE RESISTANT PROPERTIES

Edward J. McInerney; John C. Rieber, and Douglas P. Thomas, all of Louisville, Ky., assignors to General Electric Company, Louisville, Ky.

Filed Oct. 30, 1974, Ser. No. 519,095

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 24, 1976

Int. Cl.² C08K 7/14

U.S. Cl. 260—42.18 **7 Claims**

1. A composition comprising:

about 50 to about 80 weight percent of a styrene-acrylonitrile copolymer, reinforcing glass fibers in the range of about 8 to about 30 weight percent, a brominated flame-retarding additive, and polytetrafluorethylene in an amount sufficient to prevent dripping of the composition at flaming combustion conditions, said brominated flame-retarding additive being one of a brominated biphenyl or a brominated biphenyl oxide.

3,993,622

BIS-SALICYLOYL-HYDRAZINE AS STABILIZER FOR POLYMERS

Heimo Brunetti, Reinach, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 446,991, Feb. 28, 1974, abandoned, which is a division of Ser. No. 186,393, Oct. 4, 1971, Pat. No. 3,849,492. This application Feb. 11, 1975, Ser. No. 549,132

Claims priority, application Switzerland, Oct. 8, 1970, 14967/70; Aug. 6, 1971, 11997/71

Int. Cl.² C08K 5/20

U.S. Cl. 260—45.9 NC **7 Claims**

1. A composition stabilised against deterioration induced by the presence of transition metals which comprises a polymer selected from the group consisting of homopolymeric polyolefin, copolymeric polyolefin, copolymers derived from acrylonitrile, styrene and butadiene or acrylic esters and natural caoutchouc and from 0.01 to 5% by weight of said polymer of N,N′-bis-salicyloylhydrazine.

3,993,623

POLYMERS MADE FLAME RETARDANT WITH CONDENSATION PRODUCTS OF PHOSPHINE OXIDES

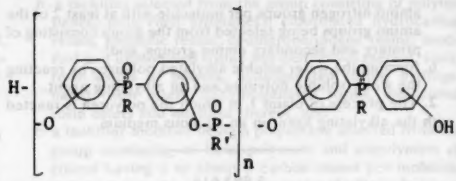
Kurt Moedritzer, Webster Groves, Mo., and Eugene L. Ringwald, Raleigh, N.C., assignors to Monsanto Company, St. Louis, Mo.

Filed May 5, 1975, Ser. No. 574,657

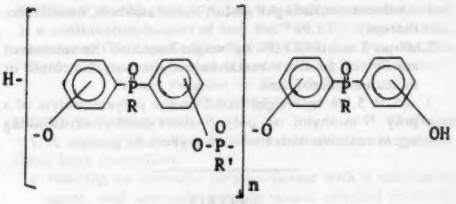
Int. Cl.² C08K 5/53

U.S. Cl. 260—45.95 D **6 Claims**

1. The composition of an organic polymer together with



where R and R′ are alkyl groups of 1 to 10 carbon atoms or aryl groups of 6 to 20 carbon atoms and *n* is 5 to 50, in the proportion of 1 to 20 wt. % based on the weight of the said organic polymer, of



3,993,624

LIGHT-SENSITIVE HIGH MOLECULAR WEIGHT COMPOUND CAPABLE OF BEING CROSS-LINKED BY IRRADIATION WITH LIGHT OR AN ELECTRON BEAM

Yukio Maekawa; Masato Satomura, and Akira Umehara, all of Asaka, Japan, assignors to Fuji Photo Film Co., Ltd., Ashigara, Japan

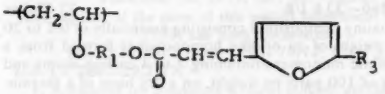
Filed Nov. 8, 1973, Ser. No. 414,609

Claims priority, application Japan, Nov. 8, 1972, 47-111804; Feb. 17, 1973, 48-19544

Int. Cl.² C08F 132/06, 136/00, 124/00, 220/42

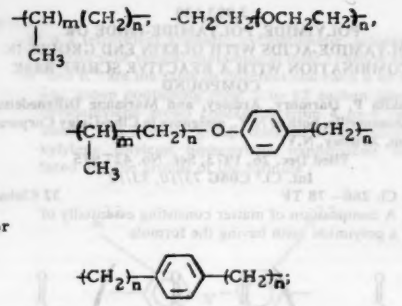
U.S. Cl. 260—47 UA **14 Claims**

1. A light-sensitive high molecular weight polymeric compound capable of being cross-linked by the action of light or an electron beam, said compound containing at least 3 mol% of the structural units represented by the following general formula (I);



(I)

wherein R_1 represents



R_3 represents a hydrogen atom, a methyl group, an ethyl group, a chlorine atom or a bromide atom; m represents 0 or 1; and n represents an integer of 1 to 4, said polymeric compound having been prepared by polymerizing at a temperature ranging from −100° to 150° C., a compound containing a vinyl ether group at one end thereof and a furanacrylic ester group at the other end of the molecule thereof in the presence of a polymerization catalyst selected from the group consisting of a Lewis-acid, a proton acid, a metallic sulfate and mixtures thereof.

9. A process for the synthesis of the light sensitive high molecular weight compound of claim 1 comprising polymerizing at a temperature ranging from −100° to 150° C., a compound containing a vinyl ether group at one end and a furanacrylic ester group at the other end of the molecule thereof in the presence of a polymerization catalyst selected from the group consisting of a Lewis-acid, a proton acid, a metallic sulfate and mixtures thereof.

3,993,625

PERMSELECTIVE POLYMERIC MEMBRANES OF ORGANIC POLYAMIDE OR POLYHYDRAZIDE

Masaru Kurihara; Kojuro Ikeda; Noriaki Dokoshi, all of Otsu, and Akio Kobayashi, Kusatsu, all of Japan, assignors to Toray Industries, Inc., Tokyo, Japan

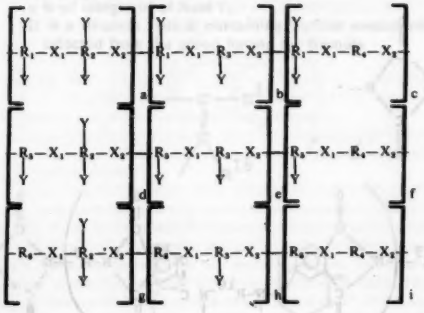
Filed May 22, 1974, Ser. No. 472,446

Claims priority, application Japan, May 28, 1973, 48-58595; Mar. 7, 1974, 49-25708; Mar. 11, 1974, 49-27164

Int. Cl.² C08G *69/12, 69/32, 73/08*

U.S. Cl. 260—47 CP **7 Claims**

1. A permselective polymeric membrane for use in desalination of saline water by reverse osmosis comprising contacting the saline water under pressure with a reverse osmosis membrane, consisting essentially of a synthetic organic polymer represented by the formula:



wherein:

a. a, b, c, d, e, f, g, h, and i represent molar fraction (%) of each component, each of them being larger than zero or equal to zero, and satisfying the following relationship:

$$a+b+c+d+e+f+g+h+i=100$$

$$a+c+d+e+f+g+h+i>0$$

$a+b+c$ are equal to or greater than 20

b. R_1, R_2, R_3, R_4, R_5, and R_6 are members selected from the group consisting of aromatic groups, heterocyclic groups and alicyclic groups having 4 to 30 carbon atoms,

c. X_1 is a group selected from the class consisting of —NH-CO—, —CO—, and —CONHNHCO—, wherein, in the case of —CO—, it is bonded directly to a nitrogen atom in the heterocyclic ring in R_1, R_5, or R_6,

d. X_2 is a group selected from the class consisting of —CONH—, —CO—, and —CONHNHCO—, wherein, in the case of —CO—, it is bonded directly to a nitrogen atom in the heterocyclic ring in R_1, R_5, or R_6,

e. Y is a group selected from the class consisting of —COOH—, SO_3H and carboxylic salts or sulfonic salts or alkali metals, alkaline earth metals, organic amine salts and mixtures thereof, and

f. said membrane being asymmetric in thickness.

3,993,626

PRODUCTION OF ETHYL CELLULOSE-COMPATIBLE PHENOL-MODIFIED HYDROCARBON RESINS FOR USE IN PRINTING INKS

James J. Laurito, Coraopolis, Pa., assignor to Neville Chemical Company, Pittsburgh, Pa.

Filed Dec. 12, 1974, Ser. No. 532,229

Int. Cl.² C09D *11/10;* **C08F** *32/06*

U.S. Cl. 260—47 UA **6 Claims**

1. An ethyl cellulose-compatible phenol-modified hydrocarbon resin having a polymerized indene content of from about 10% to about 70%, a polymerized vinyl toluene content of from about 10% to about 50%, and a polymerized dicyclopentadiene content of from about 5% to about 50%, and a polymerized phenol compound content of from about 1% to about 20%, wherein the polymerized indene, vinyl toluene, and dicyclopentadiene comprise above about 40% of the hydrocarbon resin, and wherein the phenol-modified hydrocarbon resin has a ring and ball softening point of above about 120° C, a solution viscosity (Gardner-Holdt, sec.) of from about 0.7 to about 15, a hydroxyl number of above about 10, and is both ethyl cellulose compatible and ethyl hydroxyethyl cellulose compatible.

3,993,627

LOW TEMPERATURE CURING CORROSION RESISTANT POLYURETHANE COATINGS OF HIGH SOLIDS CONTENT

Kazys Sekmakas, Chicago, and Paul Petrovich, Addison, both of Ill., assignors to DeSoto, Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 462,564, April 19, 1974, Pat. No. 3,933,760. This application Feb. 18, 1975, Ser. No. 550,849

Int. Cl.² C08G *18/32*

U.S. Cl. 260—47 CB **12 Claims**

1. A low temperature curing polyurethane coating system comprising a liquid mixture of (1) a solution copolymer consisting essentially of 55–85% styrene and monoethylenically unsaturated hydroxy functional monomer, said copolymer being in solution in a mixture of (A) inert water-free volatile organic solvent and (B) a bisphenol having its two phenolic OH groups converted to OR'OH groups where R' is an alkylene group containing from 1 to 18 carbon atoms, said bisphenol being present in an amount of from 5–75%, based on the weight of said solution copolymer; and (2) an organic polyisocyanate in at least a stoichiometric proportion with respect to the total hydroxy functionality in said copolymer, and said bisphenol.

3,993,628
MIXTURE OF THERMOPLASTIC AROMATIC COPOLYETHERKETONE/SULPHONE AND A SULPUR-CONTAINING MATERIAL AND METHOD OF CROSSLINKING THE SAME

Graham Jarrett, Hitchin, and Philip Anthony Staniland, Welwyn, both of England, assignors to Imperial Chemical Industries Limited, London, England

Filed Sept. 30, 1974, Ser. No. 510,572

Claims priority, application United Kingdom, Oct. 12, 1973, 47683/73

Int. Cl.² C08G *75/23*

U.S. Cl. 260—49 **10 Claims**

1. A mixture comprising i) at least one thermoplastic aromatic copolyetherketone/sulphone containing repeat units —Ar—CO— and —Ar—SO_2— where Ar is a bivalent aromatic radical, which may vary from unit to unit in the polymer chain, and at least some of the Ar groups have an aromatic ether group in the polymer chain ortho or para to at least one of said —CO— or —SO_2— groups, said copolyetherketone/sulphone containing from 3 to 9 —CO— links per —SO_2— link and having a reduced viscosity of at least 0.3 as measured at 25° C on a solution of the polymer in concentrated sulphuric acid containing 1 g of polymer in 100 cm^3 of solution, and ii) at least one sulphur containing material selected from elemental sulphur, aliphatic or aromatic dithiols, and aliphatic or aromatic polydisulphides, the amount of said sulphur containing material being such that the amount of sulphur present as free sulphur, or as the sulphur in the thiol or disulphide groups, is from 0.01 to 5% by weight, based on the combined weight of said polyetherketone/sulphone and said sulphur.

3,993,629
POLYESTER BASED ADHESIVE

Kenzo Hasunuma; Hideomi Watanabe, both of Odawara, and Nobuo Tsuji, Minami-ashigara, all of Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

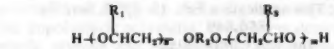
Filed Dec. 23, 1974, Ser. No. 535,908

Claims priority, application Japan, Dec. 21, 1973, 48-3115

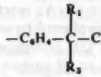
Int. Cl.² C08J *11/04*

U.S. Cl. 260—75 T **9 Claims**

1. A polyester based adhesive comprising the reaction product of (a) a polyester component comprising the reaction product of an aromatic dicarboxylic acid and a glycol and (b) at least one glycol selected from the glycols represented by the formula (I):



wherein R_1 and R_3 each represents a hydrogen atom or a methyl group; R_2 is $-(CH_2CH_2CH_2)_x(CH_2)_y-$, $-CH_2-C(CH_3)_2-CH_2-$, $-CH_2-C_6H_{10}-CH_2-$,



$-C_6H_4-$, $-C_{10}H_6-$, $-C_6H_4-O-C_6H_4-$, $-CH_2CH_2O)_2CH_2CH_2-$, $-C_6H_4-C_6H_4-$, $-CH_2C_6H_4CH_2-$, $-C_6H_4-SO_2-C_6H_4-$, or $-C_6H_4CH=CH-C_6H_4-$; and n, m, x, and y each is an integer of from 1 to 10.

3,993,630
POLYIMIDE, POLYAMIDE-IMIDE OR POLYAMIDE-ACIDS WITH OLEFIN END GROUPS IN COMBINATION WITH A REACTIVE SCHIFF BASE COMPOUND

Franklin P. Darmory, Ardsley, and Marianne DiBenedetto, Pleasantville, both of N.Y., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

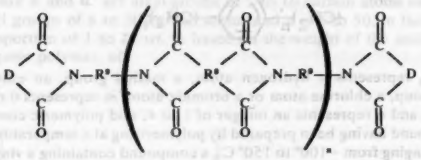
Filed Dec. 26, 1973, Ser. No. 427,975

Int. Cl.² C08G *73/10*, *73/12*

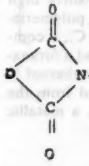
U.S. Cl. 260—78 TF **32 Claims**

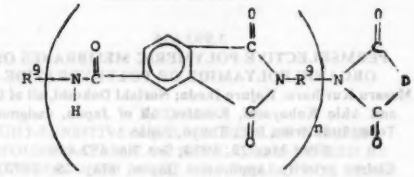
1. A composition of matter consisting essentially of

a. a polyimide resin having the formula

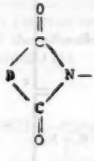


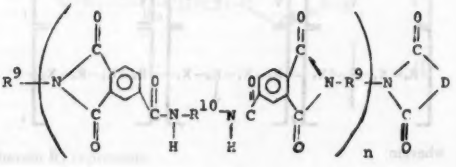
or a polyamide-imide resin having the formulas





and

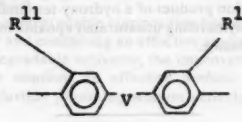




wherein

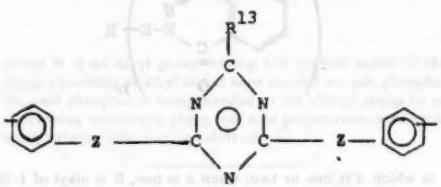
R^8 is a tetravelent aliphatic, cycloaliphatic, aromatic or heterocyclic radical containing at least 2 carbon atoms;

R^9 and R^{10} are the same or different and each is an alkylene group containing from 2 to 12 carbon atoms; a cycloalkylene group containing from 4 to 6 carbon atoms; and arylene group selected from phenylene, xylylene, tolylene, biphenylene, naphthylene, substituted arylene groups of the formula



wherein V is sulfur, carbonyl, —NH, —N— (lower)alkyl, —SS—, —O—, —N-phenyl, sulfonyl, an alkylene group of from 1 to 4 carbon atoms, a di (lower)alkyl silyl group containing from 1 to 5 carbon atoms, a diphenylsilyl group, —P(O) (lower)alkyl, said lower alkyl containing from 1 to 5 carbon atoms, —N=N—,

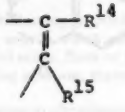
R^{11} and R^{12} are indepent and each is hydrogen, chloro, or bromo, a (lower)alkyl group containing from 1 to 5 carbon atoms, a (lower) alkoxy group containing from 1 to 5 carbon atoms or a group having the formula

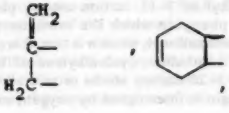


where Z is a covalent bond or —NH, and R^{13} is phenyl, piperidino, H, diphenylamino or di(lower)alkyl amino;

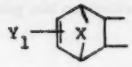
n is an integer of at least 1;

D is a divalent radical containing olefinic unsaturation selected from the group having the formula





or



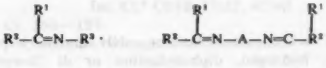
wherein

R^{14} and R^{15} independently of each other is hydrogen, methyl, bromo or chloro;

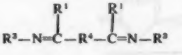
Y_1 is hydrogen or methyl

X is carbonyl, oxygen, methylene, or sulfur, and

b. from about 0.5 to about 0.166 mole equivalents per mole equivalent of (a) of a Schiff base compound of the formula



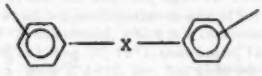
or



wherein

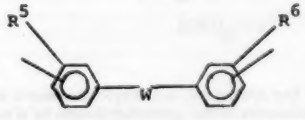
R^1 and R^2 independently is hydrogen, an alkyl group containing from 1 to 12 carbon atoms, an aryl group containing from 6 to 12 carbon atoms, an alkaryl group containing from 7 to 15 carbon atoms, ar aralkyl group containing from 7 to 15 carbon atoms, chlorophenyl, alkoxyphenyl, said alkoxy containing from 1 to 5 carbon atoms, or together with the carbon to which they are attached form a monocyclic ring containing 5 to 6 carbon atoms, with the proviso that only one of R^1 or R^2 may be hydrogen at the same time; R^3 is an alkyl group containing from 1 to 12 carbon atoms, an aryl group containing from 6 to 12 carbon atoms, an alkaryl group containing from 7 to 15 carbon atoms, an aralkyl group containing from 7 to 15 carbon atoms, chlorophenyl, alkoxyphenyl, said alkoxy containing from 1 to 5 carbon atoms, cyclohexyl or cyclophentyl;

R^4 is an alkylene group containing from 2 to 12 carbon atoms, phenylene, tolylene, biphenylene, naphthylene, or a arylene group having the formula



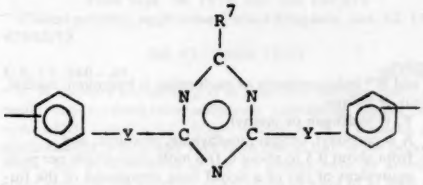
wherein X is —S—, —O—, NH, H-phenyl, sulfonyl, or an alkylene group containing from 1 to 4 carbon atoms; and

A is an alkylene group containing from 2 to 12 carbon atoms; cycloalkylene group containing from 4 to 6 carbon atoms, a xylylene group, an arylene group selected from phenylene, tolylene, biphenylene, naphthylene, a substituted arylene group of the formula



wherein W is sulfur, carbonyl, —NH, —N(lower)alkyl, —O—, —N-phenyl, sulfonyl, an alkylene group of from 1 to 4 carbon

atoms, R^5 and R^6 are independent and each is hydrogen, chloro, or bromo, (lower)alkyl of from 1 to 5 carbon atoms, (lower)alkoxy containing from 1 to 5 carbon atoms, or a group having the formula



wherein Y is a covalent bond or —NH, and R^7 is phenyl, piperidino, hydrogen, diphenylamino or di (lower)alkyl amino.

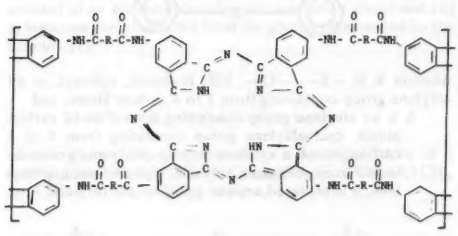
3,993,631

POLYPHTHALOCYANINES PREPARED FROM N,N-BIS(3,4-DICYANOPHENYL) ALKANEDIAMIDES

James R. Griffith, Riverdale Heights, and Jacques G. O'Rear, Temple Hills, both of Md., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Aug. 23, 1974, Ser. No. 500,209
Int. Cl.² C08G *73/06*
U.S. Cl. 260—78 TF **6 Claims**

1. A polyphthalocyanine resin having the general formula:



wherein $R = (CH_2)_{n-2}$, $(CH_2)_x CH(CH_3) (CH_2)_y$; $n = 3$ to 20; $x = 1$ to 8; and $y = 1$ to 8.

3,993,632

POLYMER COMPRISING REACTION PRODUCT OF HYDROXY-TERMINATED POLYETHER AND TETRAFLUORO-HYDRAZINE

Walter Howard Peterson, Richmond, Calif., assignor to Shell Oil Company, Houston, Tex.

Filed Aug. 17, 1962, Ser. No. 218,223
Int. Cl.² C08F *18/20*
U.S. Cl. 260—78.41 **13 Claims**

1. A polymer containing high energy groups which comprises the reaction product of a hydroxy-terminated polyether prepared by polymerizing unsaturated epoxide monomers and tetrafluorohydrazine.

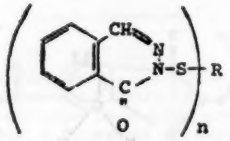
3,993,633

2(1(2H)-PHTHALAZINONE)SULFENAMIDES VULCANIZATION INHIBITORS

Mark Dennis Wolfinger, Akron, Ohio, assignor to Monsanto Company, St. Louis, Mo.

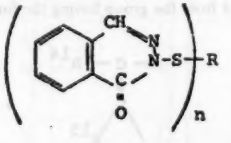
Filed Sept. 11, 1975, Ser. No. 612,366
Int. Cl.² C08K *5/44*; C07D *237/32*
U.S. Cl. 260—79.5 B **21 Claims**

1. A method of inhibiting premature vulcanization of sulfur-vulcanizable rubber containing a sulfur vulcanizing agent which comprises incorporating therein, in an amount effective to inhibit premature vulcanization, a compound of the formula



in which n is one or two; when n is one, R is alkyl of 1–20 carbon atoms, halo-lower alkyl, cycloalkyl of 5–12 carbon atoms, aralkyl of 7–12 carbon atoms, phenyl, naphthyl or substituted phenyl in which the substituents are lower alkyl, halo, nitro and sulfonyl; when n is two, R is phenylene, methylphenylene, napthalene, cycloalkylene of 5–8 carbon atoms, alkylene of 2–20 carbon atoms or said alkylene in which the alkylene chain is interrupted by oxygen, sulfur or phenylene.

12. A compound of the formula



in which n is one or two; when n is one, R is alkyl of 1–20 carbon atoms, halo-lower alkyl, cycloalkyl of 5–12 carbon atoms, aralkyl of 7–12 carbon atoms, phenyl, naphthyl or substituted phenyl in which the substituents are lower alkyl, halo, nitro and sulfonyl; when n is two, R is phenylene, methylphenylene, napthaline, cycloalkylene of 5–8 carbon atoms, alkylene of 2–20 carbon atoms or said alkylene in which the alkylene chain is interrupted by oxygen, sulfur or phenylene.

3,993,634

PHOTODEGRADABLE VINYL CHLORIDE POLYMER CONTAINING A FERROCENE AND AN α-PHENYL INDOLE

Philippe Burgaud, Brussels, Belgium, assignor to Solvay & Cie., Brussels, Belgium

Filed Feb. 28, 1975, Ser. No. 554,166

Claims priority, application Luxembourg, Apr. 19, 1974, 69892

Int. Cl.² C08F *114/06*; C08J *3/20*

U.S. Cl. 526—4 10 Claims

1. In a photodegradable composition based on a vinyl chloride polymer and containing an effective amount of a ferrocene as a photodegradable activator, the improvement wherein the composition contains an effective amount of an α-phenyl indole as a further photodegradation activator.

3,993,635

FLAME RESISTANT POLYSTYRENE

Louis A. Mango, III, Louisville, Ky., assignor to General Electric Company, Louisville, Ky.

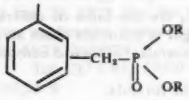
Filed Dec. 6, 1974, Ser. No. 530,174

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 24, 1976

Int. Cl.² C08F *8/40*, *8/24*

U.S. Cl. 260—42.18 7 Claims

1. A copolymer of styrene and phosphorylated styrene, said copolymer containing phenyl groups and being represented by the formula



where R is an alkyl group having 1–8 carbon atoms of the group consisting of alkyl and at least about 5 wt. pct. phosphorus, said phosphorus being bonded to the phenyl group by an intervening methylene group and said polystyrene copolymer being substantially non-crosslinked.

3,993,636

ULTRAFILTRATION PROCESS FOR OBTAINING PROTEIN ISOLATES OF VEGETABLE ORIGIN

Jean-Louis Joseph Maubois, Pace; Joseph Culioli, Le Rheu; Alain Chopin, and Marie-Christine Chopin, both of Rennes, all of France, assignors to Institut National de la Recherche Agronomique, Paris, France

Filed Sept. 13, 1974, Ser. No. 505,912

Claims priority, application France, Sept. 14, 1973, 73.33123

Int. Cl.² A23J *1/14*

U.S. Cl. 260—123.5 10 Claims

1. A process for obtaining a purified and concentrated isolate of a vegetable source which comprises

dissolving the ground seeds, flour or meal from sunflower or colza in an alkaline solution, thereby forming an alkaline protein solution;

subjecting said solution to ultrafiltration with a semipermeable membrane having a pore diameter of 0.1 to 30 mμ at a temperature of 2°–30° C, to form a retentate having an amount of nitrogenous matter (N × 6.25) in the range of 3 to 12% by weight of the retentate;

adding to said retentate a volume of wash liquid while continuing ultrafiltration at a temperature of 2°–30° C, such that when the volume of the permeate is equal to said added volume, the concentration of nitrogenous matter (N × 6.25) in the retentate will be 70 to 85% by weight of the dry matter of said retentate;

adjusting the temperature of said retentate to 20°–60° C and continuing said ultrafiltration procedure; and

thereafter recovering said concentrated and purified retentate.

3,993,637

CHELATABLE TRIAZOLYLAZO-N-ALKYL(CYCLOALKYL)-ACYLACETAMIDE DYES

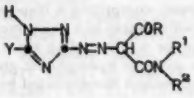
James M. Straley, and John G. Fisher, both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed July 7, 1975, Ser. No. 593,347

Int. Cl.² C09B *29/32*, *45/48*

U.S. Cl. 260—157 4 Claims

1. A chelatable compound of the formula



wherein:

R is straight or branched alkyl of 1–4 carbons;

R¹ is straight or branched alkyl of 4–8 carbons or cyclohexyl;

R² is hydrogen or straight or branched alkyl of 4–8 carbons or cyclohexyl; and

Y is straight or branched alkyl of 1–4 carbons, phenyl or hydrogen.

3,993,638

BALLASTED p-SULFONAMIDOPHENOLS CAPABLE OF RELEASING A NON-HETEROCYCLIC AZO DYE

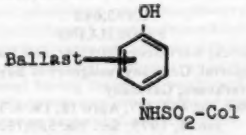
Lee J. Fleckenstein, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 351,700, April 16, 1975, Pat. No. 3,928,312, which is a continuation-in-part of Ser. No. 282,795, Aug. 22, 1972, abandoned, which is a continuation-in-part of Ser. No. 176,752, Aug. 31, 1971, abandoned. This application June 5, 1975, Ser. No. 583,940

Int. Cl.² C09B *29/36*, *29/38*; G03C *5/30*, *7/00*

U.S. Cl. 260—197 4 Claims

1. A compound having the formula:



wherein:

1. Col is a non-heterocyclic azo dye moiety, and

2. Ballast is an organic ballasting radical containing at least 8 carbon atoms which renders said compound nondiffusible in a photographic element during development with an alkaline processing composition.

3,993,639

HEPTAMINOL ADENOSINE-5'-MONOPHOSPHATE

Roland Yves Mauvernay, 13, rue Eugene Gilbert, 63201 Riom, France

Filed Feb. 5, 1975, Ser. No. 547,431
Claims priority, application France, Feb. 8, 1974, 74.04237
Int. Cl.² C07H 19/16
U.S. Cl. 536—27 1 Claim

1. Heptaminol adenosine-5'-monophosphate.

3,993,640

TREATMENT OF CELLULOSIC MATERIALS

Keith John Pickard, Widnes, and Alan Smith, Tarvin, both of England, assignors to Laporte Industries Limited, London, England

Filed Dec. 9, 1974, Ser. No. 530,964
Claims priority, application United Kingdom, Dec. 21, 1973, 59301/73
Int. Cl.² C07D 209/34; C09K 3/00; D21F 11/00
U.S. Cl. 536—30 19 Claims

1. A composition for treating cellulosic materials selected from the group consisting of cellulose, regenerated cellulose and mixtures thereof, comprising a dispersion of a reactive sizing or waterproofing agent in a liquid medium wherein the said reactive sizing or waterproofing agent is a cyclic imide substituted by an aliphatic hydrophobic group containing at least 12 carbon atoms and N-substituted by an acyl group.

3,993,641

PROCESS FOR THE PRODUCTION OF POLYISOCYANATES CONTAINING URETDIONE GROUPS

Eckhard Tiemann, Dormagen; Artur Reischl; Klaus König, both of Leverkusen, and Hartmut Hetzel, Cologne, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Oct. 17, 1975, Ser. No. 623,284
Claims priority, application Germany, Nov. 5, 1974, 2452390
Int. Cl.² C07D 229/00
U.S. Cl. 260—239 A 5 Claims

1. A process for the continuous production of aromatic polyisocyanates containing uretdione groups comprising: dimerizing aromatic polyisocyanates free from uretdione groups in the presence of catalysts which accelerate the dimerization of isocyanates at temperatures in the range of from −30° to +70° C, wherein dimerization is carried out in a continuous, coolable screw reactor into which the polyisocyanates free from uretdione groups to be dimerized and the dimerization catalyst are continuously introduced.

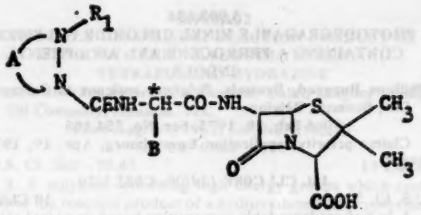
3,993,642

PENICILLINS

Wilfried Schröck; Karl-Georg Metzger, and Hans-Bodo König, all of Wuppertal, Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Division of Ser. No. 461,227, April 15, 1974. This application Jan. 6, 1975, Ser. No. 538,753
Claims priority, application Germany, Apr. 19, 1973, 2320039
Disclosure was also published under second Trial Voluntary Protest Program on Feb. 10, 1976
Int. Cl.² C07D 499/68, 499/70
U.S. Cl. 260—239.1 43 Claims

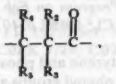
1. A compound of the formula:



or a pharmaceutically acceptable nontoxic salt thereof wherein

R_1 is hydrogen, straight or branched chain alkyl of 1 to 5 carbon atoms, monoaralkyl of up to 8 carbon atoms, monoaryl, or thienyl;

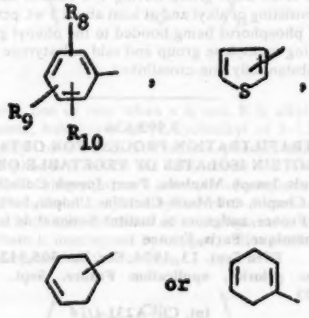
A is a moiety of the formula:



wherein

R_2, R_3, R_4 and R_5 are the same or different and each is hydrogen, straight or branched chain alkyl of 1 to 5 carbon atoms, monoaralkyl of up to 8 carbon atoms, monoaryl, or thienyl;

B is a moiety of the formula:



wherein

R_8, R_9 and R_{10} are the same or different and each is hydrogen, fluorine, chlorine, bromine, iodine, lower alkyl, lower alkoxy, lower alkylthio, lower alkylsulphonyl, sulphamyl, nitro, cyano, di(lower alkyl)amino, lower alkanoylamino, lower alkanoyloxy, lower alkylsulphonylamino, trifluoromethyl or hydroxy;

E is oxygen or sulphur; and

C is a carbon atom constituting a center of chirality.

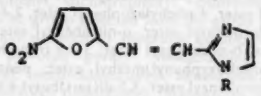
3,993,643

N-SUBSTITUTED 2-[2-(5-NITRO-2-FURYL) VINYL]IMIDAZOLES

David W. Henry, Menlo Park, and Michael Cory, Palo Alto, both of Calif., assignors to Stanford Research Institute, Menlo Park, Pa.

Filed May 7, 1976, Ser. No. 684,289
Int. Cl.² C07D 405/06
U.S. Cl. 260—240 A 9 Claims

1. As an antischistosomal agent, a compound having the structure



wherein R represents a radical selected from the group consisting of methoxybenzyl, dimethoxybenzyl, pyridylmethyl, N,N-dimethylaminobenzyl and phenoxypropyl, or the pharmaceutically acceptable acid addition salts thereof.

3,993,644

PROCESS FOR THE MANUFACTURE OF 11β,18-OXIDO-18,21-DIHYDROXY-20-OXO-PREGNANE COMPOUNDS

Julius Schmidlin, and Michel Biollaz, both of Basel, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Jan. 20, 1975, Ser. No. 542,148
Claims priority, application Switzerland, Jan. 28, 1974, 1104/74; Feb. 25, 1974, 2628/74
Int. Cl.² C07J 17/00
U.S. Cl. 260—239.55 R 15 Claims

1. Process for the manufacture of 21-acylates of 11β,18-epoxy-18,21-dihydroxy-20-oxo-pregnane compounds wherein a lead tetraacylate which has an acyloxylating action is allowed to act upon an 11β,18;18,20-bis-epoxy-pregn-20-ene compound in an inert solvent.

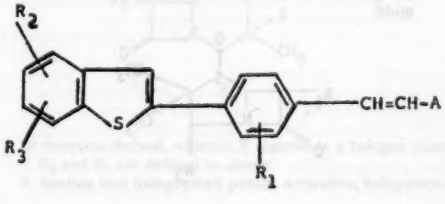
3,993,645

STILBENE OPTICAL BRIGHTENERS AND COMPOSITIONS BRIGHTENED THEREWITH

Nathan N. Crounse, Cincinnati, Ohio, and Kantilal B. Desai, Highland Heights, Ky., assignors to Sterling Drug Inc., New York, N.Y.

Division of Ser. No. 364,248, May 29, 1973, Pat. No. 3,932,301, which is a continuation-in-part of Ser. No. 118,076, Feb. 23, 1971, Pat. No. 3,781,279. This application Apr. 30, 1975, Ser. No. 573,166
Int. Cl.² C07D 209/04, 333/52
U.S. Cl. 260—240 D 6 Claims

1. A fluorescent whitening agent of the formula



wherein R_1 is hydrogen, alkyl having 1 to 6 carbon atoms, alkoxy having 1 to 6 carbon atoms or halo; R_2 and R_3 are the same or different and are members of the class consisting of H, alkyl having 1 to 6 carbon atoms, alkoxy having 1 to 6 carbon atoms, halo, dialkylamino wherein each alkyl has 1 to 6 carbon atoms, alkanoylamino having 1 to 6 carbon atoms, phenyl, phenyl substituted by alkyl having 1 to 6 carbon atoms, halo, alkoxy having 1 to 6 carbon atoms and alkanoylamino having 1 to 6 carbon atoms; and A is a monovalent aromatic radical selected from the class consisting of 9-phenanthrenyl, 9-anthryl, 2-benzofuranyl, 2-indolyl, 2-benzothiophenyl, 3-coumarinyl, 2-indenyl, 2-quinolinyl, 3-quinolynyl, 2-benzoxazoly, 2-benzothiazolyl, 2-naphtho[2,1-b]furanyl and 2-naphtho[1,2-b]furanyl.

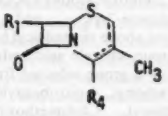
3,993,646

PROCESS FOR THE RING EXPANSION OF PENICILLINS TO CEPHALOSPORIN COMPOUNDS

Takashi Kamiya, Suita; Yoshihisa Saito, Takarazuka; Tsutomu Teraji, Hirakata; Osamu Nakaguti, Osaka; Teruo Oku, Kyoto; Hitoshi Nakamura, and Masashi Hashimoto, both of Toyonaka, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan

Division of Ser. No. 266,470, June 26, 1972, abandoned. This application Jan. 4, 1974, Ser. No. 430,688
Claims priority, application Japan, June 24, 1971, 46-46158; Aug. 14, 1971, 46-61776; Aug. 14, 1971, 46-61777; Aug. 18, 1971, 46-62687; Aug. 21, 1971, 46-63885; Aug. 21, 1971, 46-63886; Sept. 9, 1971, 46-70018; Dec. 23, 1971, 47-2516
Int. Cl.² C07D 501/10
U.S. Cl. 260—243 C 17 Claims

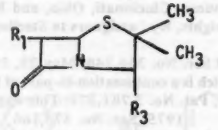
1. A process for producing a 2-cephem or 3-cephem compound of the formula:



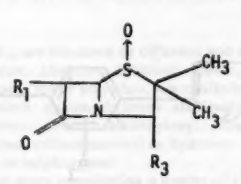
wherein R_1 represents unsubstituted amino or amino substituted by an acyl radical selected from the group consisting of formyl, acetyl, propionyl, butyryl, isobutyryl, valeryl, isovaleryl, pivaloyl, acryloyl, crotonoyl, 2-methylacryloyl, cyclopentylcarbonyl, cyclohexylcarbonyl, cycloheptylcarbonyl, cyclohexylacetyl, cycloheptylacetyl, cyclohexylpropionyl, cycloheptylpropionyl, dihydrobenzoyl, 2,4,6-cycloheptatrienylacetyl, dihydrophenylacetyl, methoxyacetyl, methylthioacetyl, 2-propenylthioacetyl, cyclohexylthioacetyl, cyclohexyloxyacetyl, dihydrophenoxyacetyl, dihydrophenylthioacetyl, cyclopentyloxycarbonyl, cyclohexyloxycarbonyl, dihydrophenoxycarbonyl, cycloheptyloxycarbonyl, benzoyl, toluoyl, naphthoyl, α-methylnaphthoyl, phthaloyl, tetrahydronaphthoyl, phenylacetyl, phenylpropionyl, phenylbutyryl, tolylacetyl, xylylacetyl, naphthylacetyl, tetrahydronaphthylacetyl, phenoxyacetyl, benzyloxycarbonyl, xylyloxycarbonyl, naphthoxycarbonyl, phenoxycarbonyl, 2-phenoxypropionyl, 2-phenoxybutyryl, carbonyl having thereon a heterocyclic compound selected from the group consisting of thiophene, benzothiophene, furan, pyran, isobenzofuran, chromene, xanthene, 2 H-pyrrole, 3 H-pyrrole, pyrrole, imidazol, pyrazole, pyridine, pyrimidine, pyrazine, pyridazine, isoindole, indole, indazole, quinoline, isoquinoline, isoxazole, oxadiazole, pyrrolidine, pyrroline, imidazolidine, piperidine, piperazine, diazole, triazole, oxazole, thiazole, thiadazole, tetrazole, benzoxazole, benzoxadiazole, benzothiazole, benzothiadiazole, benzotriazole, and benzimidazole, 1 H (or 2H)-tetrazolylacetyl, thienyla-

cetyl, thienylpropionyl, furylacetyl, piperazinylacetyl, pyrrolidinylacetyl, pyrrolidinylpropionyl, benzothiazolylacetyl, oxazolylacetyl, benzoxazolylacetyl, pyridylmethoxycarbonyl, 2-furyloxycarbonyl, 8-quinolyloxycarbonyl, the above-recited acyl radicals having at least one group thereon selected from the group consisting of methyl, ethyl, propyl, isopropyl, 1-propenyl, 2-propenyl, cyclopropyl, cyclopentyl, cyclohexyl, cycloheptyl, methoxy, ethoxy, propoxy, isopropoxy, methylthio, ethylthio, phenyl, xylyl, tolyl, benzyl, phenethyl, amino, mercapto, nitro, carboxy, hydroxy, chlorine, bromine, and fluorine, trichloroethoxycarbonyl, tribromoethoxycarbonyl, 1-cyclopropylethoxycarbonyl, 3-phenyl-5-methyl-4-oxazolylcarbonyl, 3-(2-chlorophenyl)-5-methyl-4-oxazolylcarbonyl, 3-(2,6-dichlorophenyl)-5-methyl-4-oxazolylcarbonyl, 3-(2-chloro-6-fluorophenyl)-5-methyl-4-oxazolylcarbonyl, 2-cyanoacetyl, 2-acetoxy-2-phenylacetyl, 2-(2-sydonone-3-yl)acetyl, said above-recited acyl having thereon an amino radical, wherein said amino radical is protected with a group selected from the group consisting of trichloroethoxycarbonyl, tribromomethoxycarbonyl, benzyloxycarbonyl, p-toluenesulfonyl, p-nitrobenzyloxycarbonyl, o-bromobenzyloxycarbonyl, o-nitrophenylsulfenyl, chloroacetyl, trifluoroacetyl, formyl, tertbutoxycarbonyl, p-methoxybenzyloxycarbonyl, 3,4-dimethoxybenzyloxycarbonyl, 4-phenylazobenzyloxycarbonyl, 4-(4-methoxyphenylazo)benzyloxy-carbonyl, pyridine-1-oxide-2-methoxycarbonyl, 2-pyridylmethoxycarbonyl, 2-furyloxycarbonyl, diphenylmethoxycarbonyl, 1,1-dimethylpropoxycarbonyl, isopropoxycarbonyl, 1-cyclopropylethoxycarbonyl, phthaloyl, succinyl, 1-adamantyloxycarbonyl, 8-quinolylloxycarbonyl, trityl, 2-nitrophenylthio, 2,4-dinitrophenylthio, 2-hydroxybenzylidene, 2-hydroxy-5-chlorobenzylidene, 2-hydroxy-1-naphthylmethylene, 3-hydroxy-4-pyridylmethylene, 1-methoxycarbonyl-2-propylidene, 1-ethoxycarbonyl-2-propylidene, 3-ethoxycarbonyl-2-butylidene, 1-acetyl-2-propylidene, 1-benzoyl-2-propylidene, 1-[N-(2-methoxyphenyl)carbamoyl]-2-propylidene, 1-[N-(4-methoxyphenyl)-carbamoyl]-2-propylidene, 2-ethoxycarbonylcyclohexylidene, 2-ethoxycarbonylcyclopentylidene, 2-acetylcyclohexylidene, 3,3-dimethyl-5-oxocyclohexylidene, 1-methoxycarbonyl-2-propylidene, 2-ethoxycarbonylcyclohexylidene, 1-methoxycarbonyl-1-propene-2-yl, and 2-ethoxycarbonyl-1-cyclohexenyl, the above recited acyl having thereon a hydroxy or mercapto group wherein said hydroxy or mercapto group is protected with a group selected from the group consisting of benzyloxycarbonyl, 4-nitrobenzyloxycarbonyl, 4-methoxybenzyloxycarbonyl, 3,4-dimethoxybenzyloxycarbonyl, 4-phenylazobenzyloxycarbonyl, 4-(4-methoxyphenylazo)-benzyloxycarbonyl, tert-butoxycarbonyl, 1,1-dimethylpropoxycarbonyl, isopropoxycarbonyl, diphenylmethoxycarbonyl, 2-pyridylmethoxycarbonyl,2,2,2-trichloroethoxycarbonyl, 2,2,2-tribromoethoxycarbonyl, 3-iodopropoxycarbonyl, 2-furfuryloxycarbonyl, 1-adamantyloxycarbonyl, 1-cyclopropylethoxycarbonyl, 8-quinolyloxycarbonyl, trifluoroacetyl, benzyl, trityl, methoxymethyl, 2-nitrophenylthio, and 2,4-dinitrophenylthio, and the above recited acyl having thereon a carboxy group wherein said carboxy group is protected with an ester selected from the group consisting of methyl ester, ethyl ester, propyl ester, isopropyl ester, tert-butyl ester, butyl ester, benzyl ester, diphenylmethyl ester, triphenylmethylester, p-nitrobenzyl ester, p-methoxybenzyl ester, benzoylmethyl ester, acetylmethyl ester, p-nitrobenzoylmethyl ester, p-bromobenzoylmethyl ester, p-methanesulfonylbenzoylmethyl ester, phthalimidomethyl ester, trichloroethyl ester, tribromoethyl ester, 1,1-dimethyl-2-propynyl ester, acetoxymethyl ester, propionyloxymethyl ester, pivaloyloxymethyl ester, 1,1-dimethylpropyl ester, 1,1-dimethyl-2-propenyl ester, 3-methyl-3-butenyl ester succinimidomethyl ester, 1-cyclopropylethyl ester, 3,5- di(tert)butyl-4-hydroxybenzyl ester, methylsulfenylmethyl ester, phenylsulfenylmethyl ester, methylthiomethyl ester, phenylthiomethyl ester, dimethylaminomethyl ester, quinoline-1-oxide-2-methyl ester, pyridine-1-oxide-2-methyl ester, and di(p-methoxyphenyl)methyl ester, R_4 represents hydrogen or R_3, wherein R_3 is (a) carboxy, (b) an ester selected from the group consisting of methyl ester, ethyl ester, propyl ester, isopropyl ester, butyl ester, tert-butyl ester, cyclohexyl ester, cycloheptyl ester, vinyl ester, 1-propenyl ester, 2-propenyl ester, 3-butenyl ester, phenylester, xylyl ester, tolyl ester, naphthyl ester, benzyl ester, phenethyl ester, methoxymethyl ester, ethoxymethyl ester, methylthioethyl ester, methylthiomethyl ester, dimethylaminoethyl ester, diethylaminoethyl ester, phenoxymethyl ester, phenylthiomethyl ester, methylsulfenylmethyl ester, phenylsulfenylmethyl ester, benzoylmethyl ester, toluoylmethyl ester, chloromethyl ester, bromomethyl ester, trichloroethyl ester, cyanomethyl ester, p-nitrophenyl ester, 2,4,5-trichlorophenyl ester, 2,4,6-trichlorophenyl ester, pentachlorophenyl ester, p-methanesulfonylphenyl ester, 4-phenylazophenyl ester, 2,4-dinitrophenyl ester, p-chlorobenzyl ester, o-nitrobenzyl ester, p-methoxybenzyl ester, o-nitrobenzyl ester, 3,4,5-trimethoxybenzyl ester, bis(o-methoxyphenyl)methyl ester, pentachlorobenzyl ester, trichlorobenzyl ester, 3,5-di(tert)butyl-4-hydroxybenzyl ester, p-nitrophenylthiomethyl ester, p-nitrobenzoylmethyl ester, p-bromobenzoylmethyl ester, 2-pyridylmethyl ester, p-chlorobenzoylmethyl ester, and the ester formed by the reaction of said carboxy with a compound selected from the group consisting of N-hydroxysuccinimide, N-hydroxyphthalimide, tetrahydrofuran, 1-cyclopropylethanol, 1-phenyl-3-5-pyrazolone, 3-hydroxypyridine, 2-hydroxymethylpyridine-1-oxide, 1-hydroxy-2-(1H)-pyridine, dimethylhydroxyamine, diethylhydroxyamine, glycolamide, 8-hydroxyquinoline, 2-hydroxymethylquinoline-1-oxide, acetoxime, methoxyacetylene, ethoxyacetylene, tert-butylethynyldimethylamine, tert-butylethynyldiethylamine, ethylethynyldiethylamine, and 2-ethyl-5-(3-sulfophenyl)isoxazolium hydroxide inner salt; (c) an acid amide selected from the group consisting of N-methyl acid amide, N-ethyl acid amide, N,N-dimethyl acid amide, N,N-diethyl acid amide, N-methyl-N-ethyl acid amide, and an acid amide with imidazole; (d) an acid anhydride formed by reaction of said carboxy radical with a compound selected from the group consisting of dibenzyl phosphate, phoshoric acid, sulfuric acid, pivalic acid, pentanoic acid, isopentanoic acid, 2-ethylbutanoic acid, chloroacetic acid, crotonic acid, valeric acid, propionic acid, 3-chloro-2-pentanoic acid, 3-bromo-2-butenoic acid, phenylacetic acid, phenoxyacetic acid, furaneacetic acid, thiopheneacetic acid and benzoic acid; (e) an acid halide selected from the group consisting of acid chloride and acid bromide; (f) an acid azide; or (g) a carboxy salt selected from the group consisting of a sodium salt, potassium salt, magnesium salt, methylamine salt, diethylamine salt, trimethylamine salt, aniline salt, pyridine salt, picoline salt, and N,N′-dibenzylethylenediamine salt, which comprises the steps of:

1. oxidizing a penam compound of the formula:

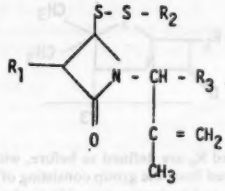


wherein R_1 and R_3 are defined as before, with an oxidizing agent selected from the group consisting of peracids, salts of peracids and hydrogen peroxide in the presence of a compound of a Group Vb or VIb metal of the Periodic Table, to form an oxidized penam compound of the formula:



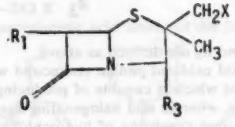
wherein R_1 and R_2 are defined as above,

2. reacting said oxidized penam with a thiophilic sulphur nucleophile having the formula R_3SH wherein R_3 is a residue of a thiophilic sulphur nucleophile selected from the group consisting of methyl, ethyl, isopropyl, propyl, butyl, isobutyl, vinyl, isopropenyl, 3-butenyl, methoxymethyl, ethoxymethyl, benzyl, phenethyl, xylylmethyl, p-chlorobenzyl, p-bromobenzyl, p-nitrobenzyl, p-methoxybenzyl, 2,4-dimethoxybenzyl, 2-chloro-4-methoxybenzyl phenyl, xylyl, tolyl, naphthyl, chlorophenyl, nitrophenyl, bromophenyl, methoxyphenyl, dimethoxyphenyl, dichlorophenyl, chloronitrophenyl, a heterocyclic group selected from the group consisting of pyrrolidinyl, piperazinyl, piperidyl, homopiperidyl, furyl, thienyl, pyrrolyl, pyridyl, imidazolizinyl, quinolyl, isoquinolyl, benzimidazolizihyl, benzothiazolyl, benzoxazolyl, thiazolyl, thiadiazolyl, thiatriazolyl, oxazolyl, oxadiazolyl, oxatriazolyl, triazolyl, and tetrazolyl, the above recited heterocyclic group substituted with a group selected from the group consisting of methyl, ethyl, methoxy, ethoxy, halogen, nitro, phenyl, tolyl, xylyl, chlorophenyl, nitrophenyl, benzyl, and phenethyl, acetyl, propionyl, benzoyl, phenylacetyl, thioacetyl, thiopropionyl, thiobenzoyl, and phenylthioacetyl, to form an oxoazetidine compound of the formula:

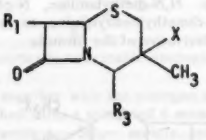


wherein R_1, R_2 and R_3 are defined as before;

3. reacting said oxoazetidine with a halogenating reagent selected from the group consisting of halogen, phosphorus pentachloride, thionylchloride, sulfur halide, sulfur dihalide, N-halosuccinimide, pyridinium hydrobromide perbromide, N-haloisocyanuric acid, phenyliododichloride and sulfenylhalide to form a halogenated penam derivative of the formula



, a halogenated cepham derivative having the formula:

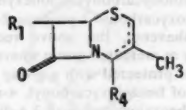


or mixtures thereof, wherein X represents a halogen atom, R_3 and R_1 are defined as above;

4. heating said halogenated penam derivative, halogenated cepham derivative or mixtures thereof with a dehydrohalogenoic acid reagent selected from the group consisting of an alkali metal hydroxide, an alkali metal carbonate, an alkali metal bicarbonate, an alkali metal bicarbonate, an alkali metal alkoxide, an alkali metal acetate, silver oxide, trialkylamine, N,N-dimethylaniline, N-phenylmorpholine, N,N-dimethylbenzylamine, pyridine, picoline, collidine, quinoline, tetraethylammonium chloride, benzyltrimethylammonium mesitoate, a basic ion exchange resin and lithium halide; and,

5. separating the 2-cephem or 3-cephem compound.

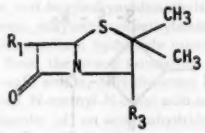
2. A process for producing a 2-cephem or 3-cephem compound of the formula:



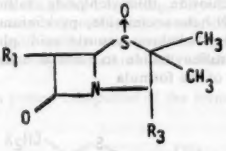
wherein R_1 represents unsubstituted amino or amino substituted by an acyl radical selected from the group consisting of formyl, acetyl, propionyl, butyryl, isobutyryl, valeryl, isovaleryl, pivaloyl, acryloyl, crotonoyl, 2-methylacrylol, cyclopentylcarbonyl, cyclohexylcarbonylcycloheptylcarbonyl, cyclohexylacetyl, cycloheptylacetyl, cyclohexylpropionyl, cycloheptylpropionyl, dihydrobenzoyl,2,4,6-cycloheptatrienylacetyl, dihydrophenylacetyl, methoxyacetyl, methylthioacetyl, 2-propenylthioacetyl, cyclohexylthioacetyl, cyclohexyloxyacetyl, dihydrophenoxyacetyl, dihydrophenylthioacetyl, cyclopentyloxycarbonyl, cyclohexyloxycarbonyl, dihydrophenoxycarbonyl, cycloheptyloxycarbonyl, benzoyl, toluoyl, naphthol, α-methylnaphthoyl, phthaloyl, tetrahydronaphthoyl, phenylacetyl, phenylpropionyl, phenylbutyryl, tolylacetyl, xylylacetyl, naphthylacetyl, tetrahydronaphthylacetyl, phenoxyacetyl, benzyloxycarbonyl, xylyloxycarbonyl, naphthoxycarbonyl, phenoxycarbonyl, 2-phenoxypropionyl, 2-phenoxybutyryl, carbonyl having thereon a heterocyclic compound selected from the group consisting of thiophene, benzothiophene, furan, pyran, isobenzofuran, chromene, xanthene, 2 H-pyrrole, 3 H-pyrrole, pyrrole, imidazol, pyazole, pyridine, pyrimidine, pyrazine, pyridazine, isoindole, indole, indazole, quinoline, isoquinoline, isoxazole, oxadiazole, pyrrolidine, pyrroline, imidazolidine, piperidine, piperazine, diazole, triazole, oxazole, thiazole, thiadazole, tetrazole, benzoxazole, benzoxadiazole, benzothiazole, benzothiadiazole, benzotriazole, and benzimidazole, 1 H (or 2H)-tetrazolylacetyl, thienylacetyl, thienylpropionyl, furylacetyl, piperazinylacetyl, pyrrolidinylacetyl, pyrrolidinylpropionyl, benzothiazolylacetyl, oxazolylacetyl, benzoxazolylacetyl, pyridylmethoxycarbonyl, 2-furyloxycarbonyl, 8-quinolyloxycarbonyl, the above-recited acyl radicals having at least one group thereon selected from the group consisting of methyl, ethyl, propyl, isopropyl, 1-propenyl, 2-propenyl, cyclopropyl, cyclopentyl, cyclohexyl, cycloheptyl, methoxy, ethoxy, propoxy, isopropoxy, methylthio, ethylthio, phenyl, xylyl, tolyl, benzyl, phenethyl, amino, mercapto, nitro, carboxy, hydroxy, chlorine, bromine, and fluorine, trichloroethoxycarbonyl, tribromoethoxycarbonyl, 1-cyclopropylethoxycarbonyl, 3-phenyl-5-methyl-4-oxazolylcarbonyl, 3-(2-chlorophenyl)-5-methyl-4-oxazolylcarbonyl, 3-(2,6-dichlorophenyl)-5-methyl-4-oxazolylcarbonyl, 3-(2-chloro-6-fluorophenyl)-5-methyl-4-oxazolylcarbonyl, 2-cyanoacetyl, 2-acetoxy-2-phenylacetyl, 2-(2-sydonone-3-yl)acetyl, said above-recited acyl having thereon an amino radical, wherein said amino radical is protected with a group selected from the group consisting of trichloroethoxycarbonyl, tribromoethoxycarbonyl, benzyloxycarbonyl, p-toluenesulfonyl, p-nitrobenzyloxycarbonyl, o-bromobenzyloxycarbonyl, o-nitrophenylsulfenyl, chloroacetyl, trifluoroeactyl, formyl, tert-butoxycarbonyl, p-methoxybenzyloxycarbonyl, 3,4-dimethoxybenzyloxycarbonyl, 4-phenylazobenzyloxycarbonyl, 4-(4-methoxyphenylazo)benzyloxycarbonyl, pyridine-1-oxide-

2-methoxycarbonyl, 2-pyridylmethoxycarbonyl, 2-furyloxycarbonyl, diphenylmethoxycarbonyl, 1,1-dimethylpropoxycarbonyl, isopropoxycarbonyl, 1-cyclopropylethoxycarbonyl, phthaloyl, succinyl, 1-adamantyloxycarbonyl, 8-quinolyloxycarbonyl, trityl, 2-nitrophenylthio, 2,4-dinitrophenylthio, 2-hydroxybenzylidene, 2-hydroxy-5-chlorobenzylidene, 2-hydroxy-1-naphthylmethylene, 3-hydroxy-4-pyridylmethylene, 1-methoxycarbonyl-2-propylidene, 1-ethoxycarbonyl-2-propylidene, 3-ethoxycarbonyl-2-butylidene, 1-acetyl-2-propylidene, 1-benzoyl-2-propylidene, 1[N-(2-methoxyphenyl)carbamoyl]-2-propylidene, 1-[N-(4-methoxyphenyl)-carbamoyl]-2-propylidene, 2-ethoxycarbonylcyclohexylidene, 2-ethoxycarbonylcyclopentylidene, 2-acetylcyclohexylidene, 3,3-dimethyl-5-oxocyclohexylidene, 1-methoxycarbonyl-2-propylidene, 2-ethoxycarbonylcyclohexylidene, 1-methoxycarbonyl-1-methoxycarbonyl-1-propene-2-yl, and 2-ethoxycarbonyl-1-cyclohexenyl, the above recited acyl having thereon a hydroxy or mercapto group wherein said hydroxy or mercapto group is protected with a group selected from the group consisting of benzyloxycarbonyl, 4-nitrobenzyloxycarbonyl, 4-methoxybenzyloxycarbonyl, 3,4-dimethoxybenzyloxycarbonyl, 4-phenylazobenzyloxycarbonyl, 4-(4-methoxyphenylazo)-benzyloxycarbonyl, tert-butoxycarbonyl, 1,1-dimethylpropoxycarbonyl, isopropoxycarbonyl, dihenylmethoxycarbonyl, 2-pyridylmethoxycarbonyl,2,2,2-trichloroethoxycarbonyl, 2,2,2-tribromoethoxycarbonyl, 3-iodopropoxycarbonyl, 2-furfuryloxycarbonyl, 1-adamantyloxycarbonyl, 1-cyclopropylenethoxycarbonyl, 8-quinolyloxycarbonyl, trifluoroacetyl, benzyl, trityl, methoxymethyl, 2-nitrophenylthio, and 2,4-dinitrophenylthio, and the above recited acyl having thereon a carboxy group wherein said carboxy group is protected with an ester selected from the group consisting of methyl ester, ethyl ester, propyl ester, isopropyl ester, tert-butyl ester, butyl ester, benzyl ester, diphenylmethyl ester, triphenylmethylester, p-nitrobenzyl ester, p-methoxybenzyl ester, benzoylmethyl ester, acetylmethyl ester, p-nitrobenzoylmethyl ester, p-bromobenzoylmethyl ester, p-methanesulfonylbenzoylmethyl ester, phthalimidomethyl ester, trichloroethyl ester, tribromoethyl ester, 1,1-dimethyl-2-propynyl ester, acetoxymethyl ester, propionyloxymethyl ester, pivaloyloxymethyl ester, 1,1-dimethylpropyl ester, 1,1-dimethyl-2-propenyl ester, 3-methyl-3-butenyl ester, succinimidomethyl ester, 1-cyclopropylethyl ester, 3,5-di(tert)butyl-4-hydroxybenzyl ester, methylsulfenylmethyl ester, phenylsulfenylmethyl ester, methylthiomethyl ester, phenylthiomethyl ester, dimethylaminomethyl ester, quinoline-1-oxide-2-methyl ester, pyridine-1-oxide-2-methyl ester, and di(p-methoxyphenyl)-methyl ester, R_4 represents hydrogen or R_3, wherein R_3 is (a) carboxy, (b) an ester selected from the group consisting of methyl ester, ethyl ester, propyl ester, isopropyl ester, butyl ester, tert-butyl ester, cyclohexyl ester, cycloheptyl ester, vinyl ester, 1-propenyl ester, 2-propenyl ester, 3-butenyl ester, phenyl ester, xylyl ester, tolyl ester, naphthyl ester, benzyl ester, phenethyl ester, methoxymethyl ester, ethoxymethyl ester, methylthioethyl ester, methylthiomethyl ester, dimethylaminoethyl ester, diethylaminoethyl ester, phenoxymethyl ester, phenylthiomethyl ester, methylsulfenylmethyl ester, phenylsulfenylmethyl ester, benzoylmethyl ester, toluoylmethyl ester, chloromethyl ester, bromomethyl ester, trichloroethyl ester, cyanomethyl ester, p-nitrophenyl ester, 2,4,5-trichlorophenyl ester, 2,4,6-trichlorophenyl ester, pentachlorophenyl ester, p-methanesulfonylphenyl ester, 4-phenylazophenyl ester, 2,4-dinitrophenyl ester, p-chlorobenzyl ester, o-nitrobenzyl ester, p-methoxybenzyl ester, p-nitrobenzyl ester, 3,4,5-trimethoxybenzyl ester, bis(p-methoxyphenyl)methyl ester, pentachlorobenzyl ester, trichlorobenzyl ester, 3,5-di(tert)butyl-4-hydroxybenzyl ester, p-nitrophenylthiomethyl ester, p-nitrobenzoylmethyl ester, p-bromobenzoylmethyl ester, 2-pyridylmethyl ester, p-chlorobenzoylmethyl ester, and the ester formed by the reaction of said carboxy with a compound selected from the group consisting of N-hydroxysuccinimide, N-hydroxyphthalimide, tetrahydrofuran, 1-cyclopropylethano, 1-phenyl-3-methyl-5-pyrazolone, 3-hydroxypyridine, 2-hydroxymethylpyridine-1-oxide, 1-hydroxy-2-(1H)-pyridine, dimethylhydroxyamine, diethylhydroxamine, glycolamide, 8-hydroxyquinoline, 2-hydroxymethylquinoline-1-oxide, acetoxime, methoxyacetylene, ethoxyacetylene, tert-butylethynyldimethylamine, tert-butylethynyldiethylamine, ethylethynyldiethylamine, and 2-ethyl-5-(3-sulfophenyl)isoxazolium hydroxide inner salt; (c) an acid amide selected from the group consisting of N-methyl acid amide, N-ethyl acid amide, N,N-dimethyl acid amide, N,N-diethyl acid amide, N-methyl-N-ethyl acid amide, and an acid amide with imidazole, (d) an acid anhydride formed by reaction of said carboxy radical with a compound selected from the group consisting of dibenzyl phosphate, phosphoric acid, sulfuric acid, pivalic acid, pentanoic acid, isopentanoic acid, 2-ethylbutanoic acid, chloroacetic acid, crotonic acid, valeric acid, propionic acid, 3-chloro-2-pentanoic acid, 3-bromo-2-butenoic acid, phenylacetic acid, phenoxyacetic acid, furaneacetic acid, thiopheneacetic acid and benzoic acid; (e) an acid halide selected from the group consisting of acid chloride and acid bromide; (f) an acid azide; or (g) a carboxy salt selected from the group consisting of a sodium salt, potassium salt, magnesium salt, methylamine salt, diethylamine salt, trimethylamine salt, aniline salt, pyridine salt, picoline salt, and N,N′-dibenzylethylenediamine salt, which comprises the steps of:

1. oxidizing a penam compound of the formula:

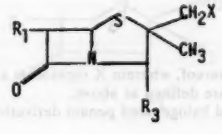


wherein R_1 and R_3 are defined as before, with an oxidizing agent selected from the group consisting of peracids, salts of peracids and hydrogen peroxide in the presence of a compound of a Group Vb or VIb metal of the Periodic Table, to form an oxidized penam compound of the formula:

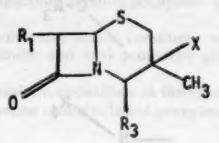


wherein R_1 and R_3 are defined as above,

2. reacting said oxidized penam compound with a halogenating agent which is capable of producing at least one halogen ion, wherein said halogenating agent is selected from the group consisting of hydrochloric acid, hydrobromic acid and hydroiodic acid, in the presence of a nitrogeneous base selected from the group consisting of pyridine, picoline, collidine, quinoline, trimethylamine triethylamine, ethyldicyclohexylamine, ethyldiisopropylamine, ammonia, aniline, N-methylaniline, N,N-dimethylaniline, N,N-diethylaniline, N-phenylmorpholine, and N,N-dimethylbenzylamine, to form a halogenated penam derivative of the formula



, a halogenated cepham derivative having the formula



or mixtures thereof, wherein X represents a halogen atom, and R_2 and R_1 are defined as above;

3. heating said halogenated penam derivative, halogenated cepham derivative or mixtures thereof with a dehydrohalogenoic acid reagent selected from the group consisting of an alkali metal hydroxide, an alkali metal carbonate, an alkali metal bicarbonate, an alkali metal alkoxide, an alkali metal acetate, silver oxide, trialkylamine, N,N-dimethylaniline, N-phenylmorpholine, N,N-dimethylbenzylamine, pyridine, picoline, collidine, quinoline, tetraethylammonium chloride, benzyltrimethylammonium mesitoate, a basic ion exchange resin and lithium halide; and,

4. separating the 2-cephem or 3-cephem compound.

3,993,647

IMIDAZOLYLACETIC ACID AMIDES

Jürgen Wenzelburger; Karl Heinz Büchel; Manfred Plempel, and Werner Meiser, all of Wuppertal, Germany, assignors to Bayer Aktiengesellschaft, Germany

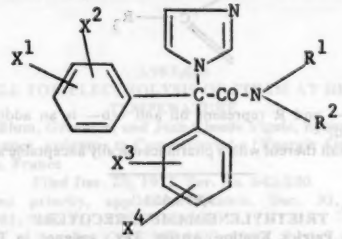
Division of Ser. No. 400,263, Sept. 24, 1973, Pat. No. 3,950,354. This application July 9, 1975, Ser. No. 594,544

Claims priority, application Germany, Sept. 26, 1972, 2247187

Int. Cl.² C07D 279/12

U.S. Cl. 260—243 R **12 Claims**

1. An imidazolylacetic acid amide of the formula:



or a pharmaceutically acceptable nontoxic salt thereof wherein

R^1 and R^2, together with the nitrogen atom to which they are attached form a saturated 6-membered heterocyclic ring contaning a $—SO_2—$ moiety, said heterocyclic ring being otherwise unsubstituted or substituted by alkyl of 1 to 4 carbon atoms or phenyl, and

X^1, X^2, X^3 and X^4 are the same or different and are each hydrogen or halogen.

3,993,648

TETRAHYDRO-2-(NITROMETHYLENE)-2H-1,3-THIAZINES

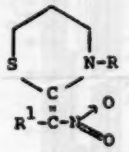
James E. Powell, Rodmersham Green near Sittingbourne, England, assignor to Shell Oil Company, Houston, Tex.

Continuation-in-part of Ser. No. 554,361, March 3, 1975, abandoned, which is a continuation-in-part of Ser. No. 468,124, May 8, 1974, abandoned. This application Mar. 29, 1976, Ser. No. 671,227

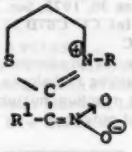
Int. Cl.² C07D 219/06

U.S. Cl. 260—243 R **7 Claims**

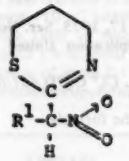
1. A resonance hybrid in which the two significant forms which contribute thereto are represented by the formula



and



and including when R is hydrogen, the tautomeric form represented by the formula



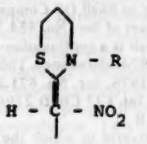
wherein R is hydrogen, or contains up to eight carbon atoms and is alkyl, alkenyl, alkoxyalkyl, cycloalkylalkyl, cyanoalkyl, haloalkenyl, phenalkyl or alkoxycarbonylvinyl.

R^1 is hydrogen or contains up to eight carbon atoms and is alkyl, alkenyl, alkynyl, haloalkyl, haloalkenyl, halo(hydroxy)alkyl, alkoxyalkyl, cyanoalkyl, hydroxyalkyl, alkoxycarbonylalkyl, alkylcarbonylalkyl, alkylthioalkyl, alkylsulfinylalkyl, phenalkyl or phenylthio optionally substituted on the ring by one or more of halogen, nitro, cyano, alkyl, phenyl, alkoxy or phenoxy; halogen; aminomethyl, $—CH_2—NR^2R^3$, R^2 is alkyl, hydroxyalkyl, alkoxyalkyl, cycloalkyl, alkenyl, phenyl or phenalkyl, and R^3 is hydrogen or one of the moieties represented by R^2;

$$\text{—}(CH_2)_n\text{—}R^4,$$

wherein n is zero, one or two, and R^4 is a heteromonocyclic moiety of from five to six carbon atoms in the ring, containing

in the ring carbon atoms and one to two of oxygen (—O—), sulfur (—S—) and nitrogen (=N— or —NH—) bonded to carbon in the ring; or is



and salts of such compounds in which R is hydrogen.

3,993,649

PROCESS FOR PREPARING HALOISOCYANURIC ACIDS

Duane L. Sawhill, Plainfield, Ill., and Henry W. Schiessl, Northford, Conn., assignors to Olin Corporation, New Haven, Conn.

Filed June 30, 1975, Ser. No. 591,576
Int. Cl.² C07D *251/36*
U.S. Cl. 260—248 C 10 Claims

1. A process for the production of polyhaloisocyanuric acids comprising reacting a dihalogen monoxide gas with solid cyanuric acid in a reaction mixture and recovering said haloisocyanuric acid produced.

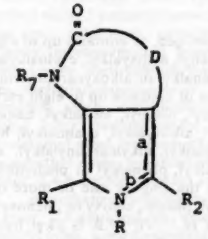
3,993,650

PYRROLO [3,4-d] PYRIMIDINES

Giorgio Tarzia, Rome, and Gianbattista Panzone, Cornaredo (Milan), both of Italy, assignors to Gruppo Lepetit S.p.A., Milan, Italy

Filed Mar. 17, 1975, Ser. No. 559,091
Claims priority, application United Kingdom, Mar. 20, 1975, 12387/74
Int. Cl.² C07D *487/04*
U.S. Cl. 260—256.4 F 1 Claim

1. A compound of the formula



wherein:

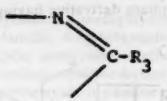
R is hydrogen, (C_{1-4}) alkyl or nil;

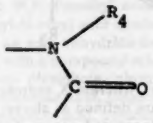
R_1 is hydrogen, phenyl or phenyl substituted with methyl, ethyl, methoxy, hydroxy, fluoro, chloro or bromo;

R_2 is hydrogen, (C_{1-4}) alkyl, phenyl, carbo (C_{1-3}) alkoxy, or carboxy;

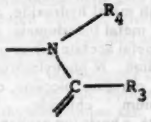
R_7 is hydrogen (C_{1-4}) alkyl, benzyl or halo-substituted benzyl;

D is



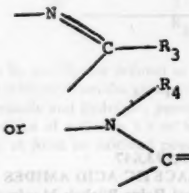


or

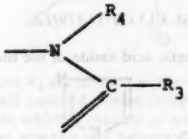


whose carbon atoms are linked to the carbon atoms of the pyrrole nucleus, and wherein R_3 is (C_{1-4}) alkyl or phenyl, and R_4 is hydrogen, (C_{1-4}) alkyl or phenyl;

the signatures —a— and —b— represent nil or an additional bond, though not simultaneously nil or an additional bond, with the proviso that, when D is



—a— is an additional bond, —b— represents nil, and R is hydrogen or (C_{1-4}) alkyl, with the further proviso that, when D represents the group



—a— and R represent nil and —b— is an additional bond;

and a salt thereof with a pharmaceutically acceptable acid.

3,993,651

TRIETHYLENEDIAMINE RECOVERY

Kenneth Patrick Keating, Austin, Tex., assignor to Texaco Development Corporation, New York, N.Y.

Filed Mar. 17, 1975, Ser. No. 558,769
Int. Cl.² C07D *471/08*
U.S. Cl. 260—268 T 12 Claims

1. Improved process for directly recovering a substantially pure triethylenediamine solute in liquid propylene glycol solution from a crude triethylenediamine reaction product mixture obtained from a liquid phase process for the preparation of triethylenediamine comprising the steps of:

admixing propylene glycol with said crude triethylenediamine reaction product mixture to form a crude triethylenediamine reaction product-propylene glycol admixture;

distilling said admixture under conditions such that said triethylenediamine and said propylene glycol codistill; and

collecting the resultant codistillate as the substantially pure triethylenediamine solute in liquid propylene glycol solution.

3,993,652

CYCLIC QUATERNARY HYDROXYALKYL PHENOXIDE CATALYSTS FOR ISOCYANATE REACTIONS

Ibrahim S. Bechara, Boothwyn; Felix P. Carroll, Chester; Rocco L. Mascioli, Media, all of Pa., and John R. Panchak, Wilmington, Del., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

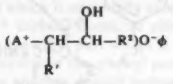
Continuation-in-part of Ser. No. 377,447, July 9, 1973, Pat. No. 3,892,687. This application July 23, 1974, Ser. No. 490,946

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 17, 1976

Int. Cl.² C07D *295/08*

U.S. Cl. 260—268 BF **3 Claims**

2. A catalyst composition for use in polymerization reactions involving organic isocyanates which consists of a quaternary ammonium compound corresponding to the formula:



wherein A is 1,4-diazabicycloocatane, 2-methyl-1,4-diazabicyclooctane, 1,4-dimethylpiperazine, 1,4-diazabicycloheptane and 1,5-diazabicyclononane, R^1 is H or A methyl group, R_2 is H or a methyl, ethyl, cyclohexyl or phenyl group, and Q is phenyl, lower alkyl phenyl or hydroxy phenyl.

3,993,653

CELL FOR ELECTROLYSIS OF STEAM AT HIGH TEMPERATURE

Pierre Blum, Grenoble, and Jean-Claude Viguie, Eybens, both of France, assignors to Commissariat a l'Energie Atomique, Paris, France

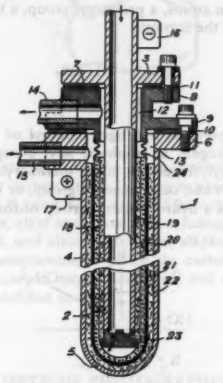
Filed Dec. 23, 1975, Ser. No. 643,830

Claims priority, application France, Dec. 31, 1974, 74.43491; Nov. 21, 1975, 75.35664

Int. Cl.² C25B *9/00, 11/03*

U.S. Cl. 204—272 **28 Claims**

1. A cell for the electrolysis of steam at high temperature, comprising a structure consisting of superposed film layers with at least two metallic elements insulated from each other for the supply of current respectively to a cathode and to an anode, wherein the cathode is formed by a substrate of a porous cermet to which is applied a thin film of solid electrolyte constituted by a mixture of refractory oxides in solid solution, said film of electrolyte being in turn coated with a porous deposit constituting the anode, current drainage between the metallic elements and the cathode and the anode



being obtained on each side of the solid electrolyte by means of thicknesses of a conductive sponge.

3,993,654

PREPARATION OF TETRACHLOROPYRIDINE

Norman LeRoy Dean, Lake Jackson; Wallace Eldon Embrey, Freeport, and John Thomas Marshall, Lake Jackson, all of Tex., assignors to The Dow Chemical Company, Midland, Mich.

Filed May 16, 1974, Ser. No. 470,473

Int. Cl.² C07D *213/61*

U.S. Cl. 260—290 HL **2 Claims**

1. In a process for preparing tetrachloropyridine by reacting pentachloropyridine, zinc, and HCl, the improvement which comprises carrying out said reaction in an aqueous medium at a temperature of at least 110° C under at least autogenous pressure, with the mole ratio of zinc/pentachloropyridine being in the range of about 1.0 to about 1.4, the mole ratio of HCl/zinc being in the range of about 0.1 to about 1.4, and the weight ratio of water/pentachloropyridine being at least about 0.4.

3,993,655

STABILIZERS FOR SYNTHETIC POLYMERS

Michael Rasberger, Allschwil, and Jean Rody, Basel, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

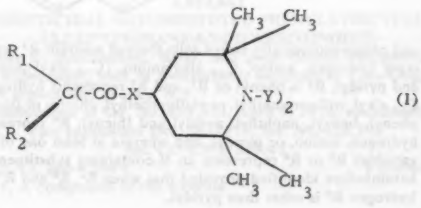
Filed Nov. 21, 1974, Ser. No. 525,810

Claims priority, application Switzerland, Dec. 10, 1973, 17271/73

Int. Cl.² C07D *401/12*

U.S. Cl. 260—293.64 **13 Claims**

1. A compound of formula (I)

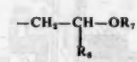


(I)

wherein

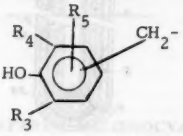
X is oxygen or —NH—,

Y represents hydrogen, the radical —O·, an alkyl group having 1 to 12 carbon atoms, an alkenyl group having 3 or 4 carbon atoms, a propargyl group, a benzyl group, or a group of the formula



wherein R_6 represents hydrogen, methyl or phenyl, and R_7 represents hydrogen, an aliphatic acyl group selected from acetyl, propionyl, hexanoyl, acryl, methacryl, 2-ethyl-hexanoyl, dodecanoyl and octadecanoyl group, or benzoyl group.

R_1 represents a hydroxybenzyl group of formula (II)



(II)

wherein

R_3 and R_4 each independently represents an alkyl group having 1 to 8 carbon atoms, and

R_5 represents hydrogen or methyl, and

R_2 represents, if X is oxygen, hydrogen, or a hydroxybenzyl group of formula (II); if, however, X is —NH—, only hydrogen.

3,993,656

1,8-NAPHTHYRIDINE COMPOUNDS

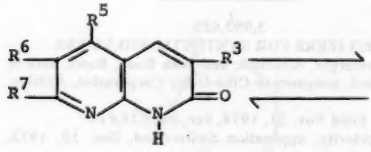
Clarence Stanley Rooney, Beaconsfield; Haydn Windsor Richard Williams, Dollard des Ormeaux, and Burton Kendall Wasson, Valois, all of Canada, assignors to Merck & Co., Inc., Rahway, N.J.

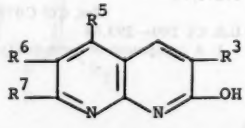
Continuation-in-part of Ser. No. 525,235, Nov. 19, 1974, which is a continuation of Ser. No. 341,420, March 15, 1973, abandoned. This application Feb. 20, 1975, Ser. No. 551,565

Int. Cl.² C07D *471/04*

U.S. Cl. 260—296 N **6 Claims**

1. A 1,8-naphthyridine-2(1H)-one having the structure:





and pharmacologically active salts thereof wherein R^3 represents hydrogen, amino, C_{1-5} alkylamino, $(C_{1-5}$ alkyl$)_2$amino, and pyridyl; R^5 is phenyl or R^7, and R^7 represents hydrogen, C_{1-5} alkyl, trifluoromethyl, pentafluoroethyl, chloro- or fluorophenyl, benzyl, naphthyl, pyridyl and thienyl; R^6 represents hydrogen, amino, or pyridyl; and wherein at least one of the variables R^3 or R^6 represents an N-containing substituent as hereinbefore identified provided that when R^5, R^6 and R^7 are hydrogen R^3 is other than pyridyl.

3,993,657

[5-(4-NITROPHENYL)-2-FUROYLMETHYL]-PYRIDINIUM BROMIDE

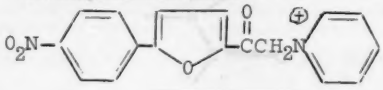
Stanford S. Pelosi, Jr., Norwich, N.Y., assignor to Morton-Norwich Products, Inc., Norwich, N.Y.

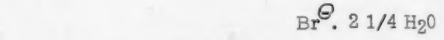
Filed June 16, 1975, Ser. No. 586,872

Int. Cl.² C07D *405/08*

U.S. Cl. 260—297 R **1 Claim**

1. A compound of the formula:





3,993,658

THIAZOLIDINYLIDENE-ISOINDOLINES

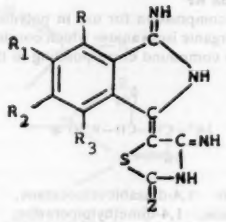
Nathan N. Crounse, and Nicholas A. Ambrosiano, both of Cincinnati, Ohio, assignors to Sterling Drug Inc., New York, N.Y.

Continuation-in-part of Ser. No. 308,163, Nov. 20, 1972, Pat. No. 3,919,235. This application Apr. 3, 1975, Ser. No. 564,725

Int. Cl.² C07D *417/14*

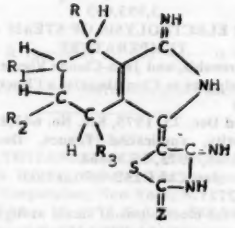
U.S. Cl. 260—306.7 R **7 Claims**

1. A compound of the formula



in which R, R_1, R_2 and R_3 are the same or different and are selected from the class consisting of hydrogen, alkyl having 1 to 3 carbon atoms, alkoxy having 1 to 3 carbon atoms, halo, trifluoromethyl, phenyl and phenyl substituted by alkyl having 1 to 3 carbon atoms, alkoxy having 1 to 3 carbon atoms and halogen; and Z is NH, O or S.

6. A compound of the formula



in which R, R_1, R_2 and R_3 are the same or different and are selected from the class consisting of hydrogen, alkyl having 1 to 3 carbon atoms, alkoxy having 1 to 3 carbon atoms, halo, trifluoromethyl, phenyl and phenyl substituted by alkyl having 1 to 3 carbon atoms, alkoxy having 1 to 3 carbon atoms and halogen; and Z is NH, O or S.

3,993,659

BIS-BENZOXAZOLYL-NAPHTHALENES AS OPTICAL BRIGHTENERS

Hans-Rudolf Meyer, Binningen, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

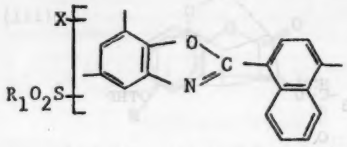
Continuation-in-part of Ser. No. 502,681, Sept. 3, 1974, abandoned, which is a continuation of Ser. No. 276,992, Aug. 1, 1972, abandoned. This application Feb. 7, 1975, Ser. No. 548,043

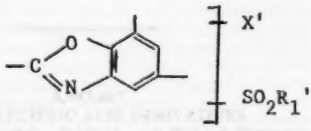
Claims priority, application Switzerland, Aug. 10, 1971, 11739/71

Int. Cl.² C07D *263/56*

U.S. Cl. 260—307 D 5 Claims

1. A 1,4-bix-benzoxazolyl-(2')-naphthalene, corresponding to the formula





wherein R_1 and R_1' independently of one another denote alkyl with 1 to 6 carbon atoms which is optionally substituted by chlorine, phenyl which is optionally substituted by chlorine or alkyl with 1 to 4 carbon atoms, or phenylalkyl with 1 to 3 carbon atoms in the alkyl part which is optionally substituted by chlorine or methyl in the phenyl part and X and X' independently of one another denote hydrogen, chlorine or alkyl with 1 to 4 carbon atoms.

3,993,660

2-[3-(PHTHALIMIDOMETHYL)-5-METHYL-4H-1,2,4-TRIAZOL-4-yl]BENZOPHENONES

Jackson B. Hester, Jr., Galesburg, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

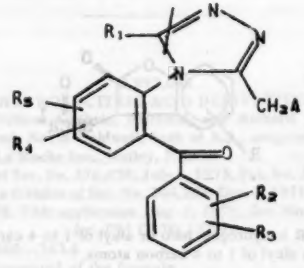
Division of Ser. No. 332,377, Feb. 14, 1973, abandoned. This application May 20, 1974, Ser. No. 471,494

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 16, 1976

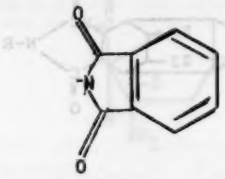
Int. Cl.² C07D *403/06*

U.S. Cl. 260—308 R 3 Claims

1. A compound of the formula:



wherein A is



wherein R_1 is selected from the group consisting of hydrogen, alkyl of 1 to 3 carbon atoms, inclusive, phenyl, benzyl, and wherein R_2, R_3, R_4, and R_5 are selected from the group consisting of hydrogen, alkyl as defined above, halogen, nitro, cyano, trifluoromethyl, and alkoxy, alkylthio, alkylsulfinyl, alkylsulfonyl, and alkanoylamino in which the carbon moiety is between 1 to 3 carbon atoms, inclusive, and dialkylamino in which alkyl is defined as above.

3,993,661

QUINONE METHIDE PHOTOGRAPHIC REAGENT PRECURSORS

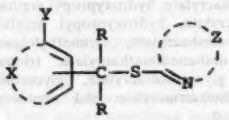
J. Michael Grasshoff, Hudson, and Lloyd D. Taylor, Lexington, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Continuation-in-part of Ser. No. 230,064, Feb. 28, 1972, abandoned, which is a division of Ser. No. 99,310, Dec. 17, 1970, Pat. No. 3,698,898. This application May 3, 1974, Ser. No. 466,629

Int. Cl.² C07D *257/04*

U.S. Cl. 260—308 D 9 Claims

1. A compound of the formula:



wherein:

X represents the atoms necessary to complete a benzene nucleus, including any alkyl group of at least 10 carbon atoms, phenyl or chloro substituents thereon;

Y is hydroxyl or a protected hydroxyl substituent which upon hydrolysis provides hydroxyl;

Z represents the atoms necessary to complete a 5-(1,2,3,4,-tetrazole) nucleus including a 1-phenyl or 1-naphthyl substituent thereon; and

each R represents hydrogen or a 1 to 4 carbon alkyl group, with the — C — S — linkage being bonded to a nuclear carbon atom of X in a position ortho or para to the Y substituent.

3,993,662

INSECTICIDAL N-(SUBSTITUTED PHENYL)-TRICYCLO [3,2,2,0^{2,4}]NONANE-6,7-DICARBOXIMIDES

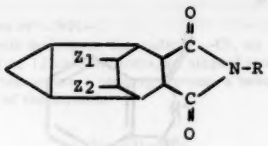
Hans U. Brechbühler, Basel, and Jean Claude Petitpierre, Kaiseraugst, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation of Ser. No. 459,434, April 9, 1974, abandoned. This application Oct. 28, 1975, Ser. No. 626,395

Int. Cl.² C07D *209/48*

U.S. Cl. 260—326 C 9 Claims

1. A compound of the formula



wherein R represents a phenyl mono- to trisubstituted, identically or differently, by fluorine, chlorine, bromine, iodine, trifluoromethyl, ethyl, methylthio, nitro or cyano, or monosubstituted by a methylendioxy group, and Z_1 and Z_2 together with the carbon atoms to which they are bound represent a carbon-carbon bond.

3,993,663

CURABLE RESINOUS COMPOSITION

Eiichiro Takiyama, Kamakura; Toshiaki Sugimoto, and Toshiaki Hanyuda, both of Yokohama, all of Japan, assignors to Showa High Polymer Co., Ltd., Tokyo, Japan

Filed Dec. 27, 1974, Ser. No. 536,914

Int. Cl.² C07D *317/04*; C08F *24/00*

U.S. Cl. 260—340.7 **3 Claims**

1. A curable composition prepared by reacting

a. an unsaturated polycycloacetal selected from the group consisting of diallylidene pentaerythritol and triallylidene sorbitol,

b. an ester selected from the group consisting of hydroxyethyl methacrylate, hydroxypropyl methacrylate, hydroxyethyl acrylate, hydroxypropyl acrylate, trimethylolpropanedimethacrylate, trimethylolpropanediacrylate, trimethylolethanedimethacrylate, trimethylolethanediacrylate, glycerinediacrylate, glycerinedimethacrylate, pentaerythritoltriacrylate and pentaerythritoltrimethacrylate, and

c. a member selected from the group consisting of an alcohol containing at least two hydroxy groups, a polyether containing at least two hydroxy groups and a polyester containing at least two hydroxy groups,

in a molar ratio of component a : component b : component c of 1 : 0.1 – 3 : 0.1 – 2.9, the said amount of component c being based on each hydroxy group in component b.

3,993,664

PREPARATION OF PROSTAGLANDIN INTERMEDIATES

Lawrence Libit, 639 Library Place, Evanston, Ill. 60201

Filed June 24, 1974, Ser. No. 482,082

Int. Cl.² B01J *1/10*; C07D *307/83, 309/22*

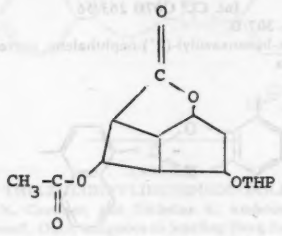
U.S. Cl. 260—343.3 R **8 Claims**

1. In a process for producing intermediates useful in the production of prostaglandins, the steps which comprise:

a. providing a solution of mono-tetrahydropyranyl ether in an inert organic solvent together with pyridine,

b. admixing said solution with an inert organic solvent solution of 3-acetoxy acryloyl chloride to produce the 3-acetoxy acryloyl ester of mono-tetrahydrofuranyl ether, and

c. then subjecting said ester to photocyclization to effect ring closure to produce a compound having the formula



(III)

3,993,665

3-AMIDOCOUMARANONES

Hermann Oediger, Cologne, and Rudolf Braden, Odenthal-Scheuren, both of Germany, assignors to Bayer Aktiengesellschaft, Germany

Division of Ser. No. 310,792, Nov. 30, 1972, Pat. No. 3,880,919. This application Aug. 8, 1974, Ser. No. 495,554

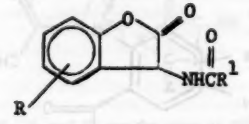
Claims priority, application Germany, Dec. 17, 1971, 2172717

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 3, 1976

Int. Cl.² C07D *493/00*

U.S. Cl. 260—343.3 R **5 Claims**

1. A compound of the formula:



wherein R is hydrogen, halo or alkyl of 1 to 4 carbon atoms and R^1 is alkyl of 1 to 4 carbon atoms.

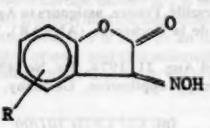
3,993,666

COUMARANEDIONE-3-MONOXIMES

Hermann Oediger, Cologne, and Rudolf Braden, Odenthal-Scheuren, both of Germany, assignors to Bayer Aktiengesellschaft, Germany

Division of Ser. No. 310,792, Nov. 30, 1972, Pat. No. 3,880,919. This application Aug. 8, 1974, Ser. No. 495,550
Claims priority, application Germany, Dec. 17, 1972, 2162717
Disclosure was also published under second Trial Voluntary Protest Program on Feb. 3, 1976
Int. Cl.[2] C07D *493/00*
U.S. Cl. 260—343.3 R 5 Claims

1. A compound of the formula:



wherein R is hydrogen, halo or alkyl of 1 to 4 carbon atoms.

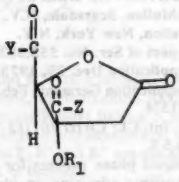
3,993,667

HYDROXYCITRIC ACID DERIVATIVES

Robert William Guthrie, Fairfield, and Richard Wightman Kierstead, North Caldwell, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 376,478, July 5, 1973, Pat. No. 3,919,254, which is a division of Ser. No. 204,288, Dec. 2, 1971, Pat. No. 3,767,678. This application Aug. 1, 1975, Ser. No. 600,996
Int. Cl.[2] C07D *307/32*
U.S. Cl. 260—343.6 4 Claims

1. A compound of the formula



wherein R_1 is lower alkanoyl; Y is OR_2'; Z is OR_2; where R_2 is lower alkyl; R_2' is lower alkyl; and the optical antipodes and pharmaceutically acceptable salts thereof.

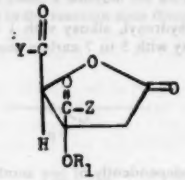
3,993,668

HYDROXYCITRIC ACID DERIVATIVES

Robert William Guthrie, Fairfield, and Richard Wightman Kierstead, North Caldwell, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 376,478, July 5, 1973, Pat. No. 3,919,254, which is a division of Ser. No. 204,288, Dec. 2, 1971, Pat. No. 3,767,678. This application Aug. 1, 1975, Ser. No. 600,997
Int. Cl.[2] C07D *307/32*
U.S. Cl. 260—343.6 4 Claims

1. A compound of the formula



wherein R_1 is lower alkanoyl; Y is NR_3R_4; Z is OR_2; where R_2 is lower alkyl; R_3 and R_4 each taken independently is lower alkyl;
and the optical antipodes and pharmaceutically acceptable salts thereof.

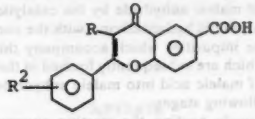
3,993,669

MONO- AND DISUBSTITUTED 1.4-BENZOPYRONE-6-CARBOXYLIC ACIDS AND DERIVATIVES THEREOF

Jürg R. Pfister, Los Altos, Calif., assignor to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Continuation-in-part of Ser. No. 476,751, June 5, 1974, abandoned. This application Apr. 17, 1975, Ser. No. 569,023
Int. Cl.[2] C07D *311/02*
U.S. Cl. 260—345.2 13 Claims

1. A compound of the formula



and the pharmaceutically acceptable non-toxic salts and esters thereof, wherein:
R is lower alkoxy; and
R^2 is hydrogen, hydroxy, lower alkoxy or halo; provided that when R is lower alkoxy containing more than 2 carbon atoms R^2 is not hydrogen, 3'-lower alkoxy or 4'-fluoro.

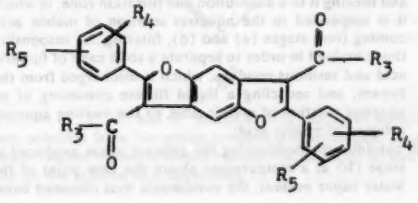
3,993,670

BENZODIFURAN COMPOUNDS

Peter Hartmann, Cologne-Stammheim, and Hans Theidel, Leverkusen, both of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Feb. 8, 1974, Ser. No. 440,858
Claims priority, application Germany, Feb. 9, 1973, 2306515
Disclosure was also published under second Trial Voluntary Protest Program on Feb. 3, 1976
Int. Cl.[2] C07D *307/84*
U.S. Cl. 260—346.2 M 2 Claims

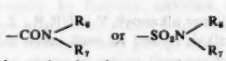
1. A benzodifuran compound of the formula



wherein:

R_3 denotes hydroxyl, alkoxy with 1 to 20 carbon atoms, cycloalkoxy with 3 to 7 carbon atoms, benzyloxy or the group

R_4 and R_5 independently of one another denote hydrogen. cyano, phenyl, alkyl with 1 to 4 carbon atoms, alkoxy with 1 to 4 carbon atoms, phenoxy



R_6 and R_7 independently of one another denote hydrogen or alkyl with 1 to 4 carbon atoms, with the proviso that R_4 and R_5 do not simultaneously denote hydrogen.

3,993,671

METHOD FOR THE CONTINUOUS DEHYDRATION OF MALEIC ACID

Jean Ramioulle, Bierghes, Belgium, assignor to U C B, Societe Anonyme, Belgium

Filed Aug. 27, 1974, Ser. No. 501,196

Claims priority, application United Kingdom, Aug. 28, 1973, 40528/73

Int. Cl.² C07D *307/60*

U.S. Cl. 260—346.8 M **4 Claims**

1. A continuous process for the preparation of maleic anhydride from an aqueous solution of maleic acid formed in the production of maleic anhydride by the catalytic oxidation of aliphatic or aromatic hydrocarbons, with the continuous elimination of the impurities which accompany this maleic acid solution or which are subsequently formed in the course of the conversion of maleic acid into maleic anhydride, which comprises the following stages:

a. continuously heating the starting aqueous solution of maleic acid in a concentration zone kept at a temperature of 100° to 150° C. and at a pressure of 400 to 760 mm.Hg. in order to obtain molten maleic acid containing 0 to 10% by weight of water and water vapor, and washing said water vapor in order to recover entrained maleic acid therefrom, the aqueous solution of maleic acid thus formed being fed to stage (c);

b. continuously feeding the molten maleic acid obtained in stage (a) to a conversion zone kept at a temperature of 115° to 165° C. and at a pressure of 40 to 200 mm.Hg. and said conversion zone containing

i. a liquid suspension composed of a reaction mixture containing about 1 to 20% by weight of maleic acid, 0 to 30% by weight of fumaric acid, 99 to 55% by weight of maleic anhydride and 0 to 5% by weight of resinous residues, the composition of said suspension being continously maintained, and,

ii. a purified gaseous phase containing maleic anhydride and water vapor, the amount of molten maleic acid added in an hour to the said reaction mixture representing from 10 to 50% of the weight of said reaction mixture;

c. continuously or semi-continuously withdrawing from 0.5 to 5% by weight of the said reaction mixture per hour, and feeding it to a dissolution and filtration zone, in which it is suspended in the aqueous solution of maleic acid coming from stages (a) and (d), filtering the suspension thus obtained in order to separate a solid cake of fumaric acid and resinous residues, which is discharged from the system, and recycling a liquid filtrate consisting of an aqueous solution of maleic acid, to the starting aqueous solution of maleic acid;

d. continuously condensing the gaseous phase produced in stage (b) at a temperature above the dew point of the water vapor present, the condensate thus obtained being maleic anhydride with a purity of at least 99%, which is recovered as the product of the process, while washing with water the residual water vapor, which still contains entrained maleic anhydride, in order to form an aqueous solution of maleic acid, which is recycled to stage (c).

3,993,672

PROCESS FOR DIRECT OLEFIN OXIDATION

Henri Arzoumanian; Alain A. Blanc, both of Marseille, France; Ulrich Hartig, Neckargmund, Germany, and Jacques V. Metzger, Marseille, France, assignors to Agence Nationale de Valorisation de la Recherche (ANVAR), Neuilly-sur-Seine, France

Filed Aug. 21, 1974, Ser. No. 499,174

Claims priority, application Germany, Sept. 7, 1973, 7332327

Int. Cl.² C07D *301/06*

U.S. Cl. 260—348.5 V **16 Claims**

1. A process for oxidising an olefin containing from 3 to 30 carbon atoms to form an epoxide and an allyl alcohol, which process comprises forming a solution of the olefin in an organic solvent which is not oxidised under the reaction conditions, dissolving in the solution a first catalyst which is a soluble compound of rhodium, and a second catalyst which is a soluble compound of molybdenum, tungsten, vanadium, niobium, titanium, and manganese which together catalyse the oxidation of the olefin, and contacting the catalyst-containing solution so formed with a gas which includes oxygen but is free from hydrogen, until substantial quantities of the epoxide and the allyl alcohol have been formed.

3,993,673

PRODUCTION OF OLEFIN OXIDES

Charles Henry McMullen, Scarsdale, N.Y., assignor to Union Carbide Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 553,583, Feb. 27, 1975, abandoned. This application Dec. 29, 1975, Ser. No. 645,038

Claims priority, application Germany, Feb. 26, 1970, 1942502, Sept. 27, 1973, 2231374

Int. Cl.² C07D *301/12*

U.S. Cl. 260—348.5 L **15 Claims**

1. A catalytic liquid phase process for the production of olefin oxides comprising admixing an olefin and hydrogen peroxide in the presence of an arsenic catalyst which is provided to the reaction as either elemental arsenic, an arsenic compound or mixtures thereof, the arsenic content of said compound being present in catalytically active amounts, said compound being essentially free of tungsten, molybdenum, vanadium and chromium; and the temperature of the admixture being in the range of about 25° to about 200° C.

3,993,674

NOVEL PROSTAGLANDINS

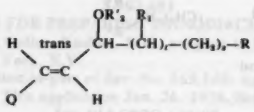
Robert Eugene Schaub, Upper Saddle River, and Martin Joseph Weiss, Oradell, both of N.J., assignors to American Cyanamid Company, Stamford, Conn.

Division of Ser. No. 353,152, April 20, 1973, Pat. No. 3,884,969. This application Mar. 4, 1975, Ser. No. 555,219

Int. Cl.² C09B *11/00, 11/06*

U.S. Cl. 260—387 **10 Claims**

1. Compounds of the formula:



wherein R is selected from the group consisting of cycloalkyl having from 3 to 9 carbon atoms, cycloalkenyl having from 5 to 9 carbon atoms, mono- or di-(loweralkyl)substituted cycloalkyl having from 3 to 8 carbon atoms in the ring, mono- or di-(lower-alkyl)substituted cycloalkenyl having from 5 to 8 carbon atoms in the ring, and adamantyl with the proviso that when R is a 3 carbon cycloalkyl group or a cycloalkenyl group, then the sum of s and t is at least one; R_1 is an alkyl group having up to 3 carbon atoms; R'_2 is selected from the group consisting of triphenylmethyl and mono- or di-methoxy substituted triphenylmethyl; s is zero or an integer from 1 to 5, inclusive; t is zero or one; and Q is selected from the group consisting of iodine, lithium and lithio tri(lower-alkyl)aluminate.

3,993,675

PROCESS FOR THE PREPARATION OF 1α,25-DIHYDROXYCHOLECALCIFEROL

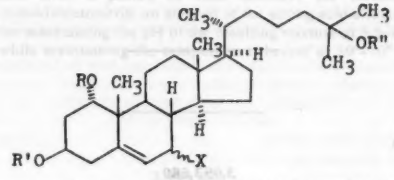
Milan Radoje Uskokovic, Upper Montclair; Thomas Albert Narwid, Pompton Plains, both of N.J.; Jerome Anthony Iacobelli, Woodside, N.Y., and Enrico Baggiolini, Nutley, N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Feb. 24, 1975, Ser. No. 552,027

Int. Cl.² C07J *5/00*

U.S. Cl. 260—397.2 **17 Claims**

1. A compound of the formula



wherein R, R′ and R″ are hydrogen, alkanoyl having 2 to 8 carbons atoms, cycloalkanoyl having 4 to 8 carbon atoms, alkylcycloalkanoyl having 5 to 8 carbon atoms, tetrahydropyranyl or tetrahydrofuryl and X is halo, with the proviso that R, R′ and R″ are not each simultaneously acetyl when X is bromo.

3,993,676

OXIDATION OF ALKANES

Anatoli Onopchenko, Monroeville, and Johann G. D. Schulz, Pittsburgh, both of Pa., assignors to Gulf Research & Development Company, Pittsburgh, Pa.

Continuation-in-part of Ser. No. 134,886, April 16, 1971, abandoned. This application June 2, 1975, Ser. No. 582,728

Int. Cl.² C07C *51/14*

U.S. Cl. 260—413 **5 Claims**

1. A process for converting an alkane having from 11 to 120 carbon atoms to a product predominating in carboxylic acids of lesser carbon numbers which consists essentially in heating, while stirring, a charge mixture consisting essentially of an alkane, acetic acid and molecular oxygen, wherein said alkane and said acetic acid are present in a weight ratio of about 3:1 to about 1:1, in a temperature range of about 100° to about 200° C. in the absence of a heavy metal catalyst, and wherein said oxygen is introduced sufficient to maintain a pressure of about 100 p.s.i.g. to about 250 p.s.i.g.

5. The process of claim 1 wherein the water of reaction is permitted to remain in the reaction zone throughout the reaction period.

3,993,677

1,2,3,4-TETRAHYDRO-4-OXO-1-NAPHTHYLISOCYANATE

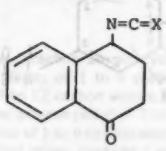
Goro Asato, Titusville, N.J., assignor to American Cyanamid Company, Stamford, Conn.

Filed Nov. 3, 1975, Ser. No. 628,030

Int. Cl.² C07C *119/048, 161/04*

U.S. Cl. 260—453 AR **3 Claims**

1. A compound of the formula:



wherein X is oxygen, the racemic mixture and the optical isomers thereof.

3,993,678

STABILIZED ALPHA-CYANOACRYLATE COMPOSITIONS

Norman P. Sweeny, North Oaks, Minn., and Karl Friedrich Thom, Cologne, Germany, assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Division of Ser. No. 445,862, Feb. 26, 1974, Pat. No. 3,943,146, which is a division of Ser. No. 262,557, June 14, 1972, Pat. No. 3,839,282. This application Aug. 27, 1975, Ser. No. 608,267

Int. Cl.² C07C *121/30, 121/52*

U.S. Cl. 260—465 D **4 Claims**

1. A stabilized composition comprising an alpha-cyanoacrylate monomer of the formula $CH_2{=}C(CN)COOR$, wherein R is alkyl or phenyl, admixed with a stabilizing amount of a compound of the formula

$$(\text{Imid})_n \cdot SO_3$$

wherein

n is 1, 2, or 3 or mixtures thereof, and

Imid is a compound of the formula

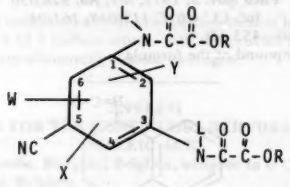
wherein R^1, R^3, R^4 and R^5 independently represent substituents selected from the group consisting of hydrogen, an aliphatic radical and an aromatic radical, and together R^4 and R^5 can be the residue of a fused ring.

3,993,679
CYANO PHENYLENE DIOXAMIC MOLECULES

Charles M. Hall, and John B. Wright, both of Kalamazoo, Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Continuation-in-part of Ser. No. 317,005, Dec. 20, 1972, abandoned. This application July 26, 1973, Ser. No. 382,762
The portion of the term of this patent subsequent to Aug. 3, 1976, has been disclaimed.
Int. Cl.² C07C *121/52*
U.S. Cl. 260—465 D 22 Claims

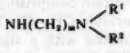
1. A compound of the formula



wherein W, X, and Y can be the same or different and are selected from the group consisting of hydrogen, alkyl from one to six carbon atoms, inclusive, phenyl, alkoxy with the alkyl group having from one to six carbon atoms, inclusive, hydroxy, nitro, halogen, trifluoromethyl and

wherein Q is selected from

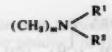
and



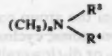
wherein D is selected from the group consisting of hydrogen, alkyl from one to six carbon atoms, inclusive, phenyl,

and a pharmaceutically acceptable metal or amine cation with the proviso that

where R is alkyl from one to six carbon atoms, inclusive, or phenyl, and Q is OD, then D is alkyl from one to six carbon atoms, inclusive, hydrogen,



or phenyl, and when R is

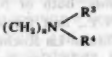


and Q is OD, then D is the same as R

and with the further proviso that when R is hydrogen or a pharmaceutically acceptable metal or amine cation and Q is OD, then D is the same as R, m is 2 or 3, R^1 and R^2 are the same or different and are selected from the group consisting of hydrogen, alkyl from one to three carbon atoms, inclusive, and

L is selected from the group consisting of hydrogen, alkyl of from one to six carbon atoms, inclusive, benzyl, and monosubstituted benzyl wherein the substituent is selected from the group consisting of alkyl from one to four carbon atoms, inclusive, and halogen;

R is selected from the group consisting of hydrogen, alkyl from one to six carbon atoms, inclusive, phenyl, a pharmaceutically acceptable metal or amine cation, and



where n is 2 or 3, R^3 and R^4 are the same or different and are selected from the group consisting of hydrogen, alkyl of one to three carbon atoms, inclusive.

3,993,680
AMMOXIDATION USING CHROMIUM-CONTAINING CATALYSTS

Robert K. Grasselli, Chagrin Falls; Arthur F. Miller, and Wilfrid G. Shaw, both of Lyndhurst, all of Ohio, assignors to The Standard Oil Company (Ohio), Cleveland, Ohio

Division of Ser. No. 393,732, Sept. 4, 1973, Pat. No. 3,956,181. This application Dec. 18, 1974, Ser. No. 532,096
Int. Cl.² C07C *120/14*
U.S. Cl. 260—465.3 6 Claims

1. In the process for the ammoxidation of propylene or isobutylene to produce acrylonitrile or methacrylonitrile comprising contacting the propylene or isobutylene with ammonia and molecular oxygen in the presence of a catalyst at a temperature of about 200° to about 600° C., the improvement comprising

using as the catalyst the catalyst of the formula

$$A_a D_b Ni_c Co_d Cr_e Bi_f Mo_{12} O_x$$

wherein

A is an alkali metal, Tl, In, Ag, Cu, rare earth metal or mixture thereof; and

D is P, As, Sb, Sn, Ge, B, W, Th, V, Ti, Si or mixture thereof;

and wherein

a and *b* are 0–4;

c and *d* are 0 to 20 with $c+d$ greater than or equal to 0.1;

e is 0.1 to about 10;

f is about 0.01 to 6; and

x is the number of oxygens required to satisfy the valence requirements of the other elements present.

3,993,681

PROCESS FOR PREPARING IMINODIACETONITRILE

Barry Allen Cullen, Nashua, N.H., assignor to W. R. Grace & Co., New York, N.Y.

Continuation-in-part of Ser. No. 565,148, April 4, 1975, abandoned. This application Jan. 26, 1976, Ser. No. 652,497

Int. Cl.² C07C *120/00*

U.S. Cl. 260—465.5 A 7 Claims

1. In a batch process for preparing iminodiacetonitrile comprising reacting hexamethylenetetramine and HCN in an acidic aqueous medium and recovering the iminodiacetonitrile, the improvement comprising:

a. forming a first solution by admixing anhydrous HCN and a second solution having a pH of 5–7, a temperature of 0°–50° C, and consisting essentially of water, a strong acid, and hexamethylenetetramine, the HCN present in the first solution being 6–50% of that used per batch and the hexamethylenetetramine present in the first solution being 0.5–45% of that used per batch, the mole ratio of HCN to hexamethylenetetramine in the first solution being greater than 6:1 and less than 12:1;

b. forming a third solution by simultaneously adding to the first solution: (i) anhydrous HCN; and (ii) a fourth solution consisting essentially of water, hexamethylenetetramine, and the strong acid while maintaining the temperature of the resulting third solution at 10°–75° C, the fourth solution containing one mole of hexamethylenetetramine per equivalent of the acid, the anhydrous HCN and the fourth solution being added at rates such that: (I) the mole ratio of HCN to hexamethylenetetramine in the third solution is at least 6:1; and (II) the pH of the third solution is 5.5–6.5;

c. adjusting the temperature of the third solution to 30°–70° C if it is not already within this temperature range; and

d. forming iminodiacetonitrile by adding to the third solution over a period of time effective for forming iminodiacetonitrile an amount of the strong acid effective for maintaining the pH of the resulting mixture at 5.5–6.5 while maintaining the temperature thereof at 30°–70° C.

3,993,682

SUBSTITUTED PHENYLGUANIDINES AND PROCESSES FOR THEIR PREPARATION AND USE

Heinrich Kölling, Haan; Herbert Thomas, Wuppertal-Elberfeld; Arno Widdig, Blecher, and Hartmund Wollweber, Wuppertal-Elberfeld, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

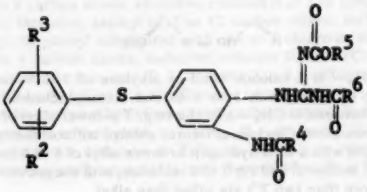
Filed Apr. 28, 1975, Ser. No. 572,224

Claims priority, application Germany, May 15, 1974, 2423679

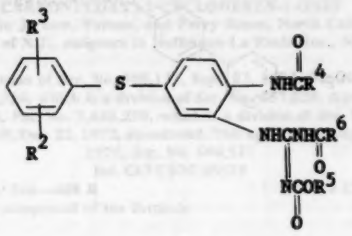
Int. Cl.² C07C *149/40*

U.S. Cl. 260—470 11 Claims

1. A member selected from the group consisting of an N-(4-phenylthio-2-amidophenyl)guanidine compound of the formula:



and an N-(5-phenylthio-2-amidophenyl)guanidine of the formula:



wherein

R^4 is alkyl of 1 to 6 carbon atoms, cycloalkyl of 3 to 10 carbon atoms, alkoxy of 1 to 6 carbon atoms, phenyl, phenylalkyl of 7 to 12 carbon atoms, alkoxyalkyl of 2 to 12 carbon atoms, phenoxyalkyl of 7 to 12 carbon atoms, amino, alkylamino of 1 to 6 carbon atoms or dialkylamino wherein each alkyl group contains 1 to 6 carbon atoms;

R^5 is alkyl of 1 to 6 carbon atoms, alkenyl of 2 to 6 carbon atoms or alkynyl of 2 to 6 carbon atoms; and

R^6 is hydrogen, alkyl of 1 to 6 carbon atoms, cycloalkyl of 3 to 10 carbon atoms, alkenyl of 2 to 6 carbon atoms, alkynyl of 2 to 6 carbon atoms, alkoxy of 1 to 6 carbon atoms, alkenyloxy of 2 to 6 carbon atoms, alkynyloxy of 2 to 6 carbon atoms, phenyl, phenylalkyl of 7 to 12 carbon atoms, phenoxyalkyl of 7 to 12 carbon atoms, alkoxyalkyl of 2 to 12 carbon atoms or alkoxyalkoxy of 2 to 12 carbon atoms;

each of R^2 and R^3 independent of the other is hydrogen, halogeno, alkyl of 1 to 6 carbon atoms, alkoxy of 1 to 6 carbon atoms, alkylthio of 1 to 6 carbon atoms, trifluoromethyl, alkanoyl of 1 to 6 carbon atoms, amino, alkanoylamino of 1 to 6 carbon atoms or carbalkoxy of 2 to 7 carbon atoms.

3,993,683

BIPHENYLYL DERIVATIVES

Josef Nickl; Erich Müller, both of Biberach an der Riss; Berthold Narr, Mettenberg; Walter Haarmann, Biberach an der Riss; Wolfgang Schröter, Biberach an der Riss, and Rüdolf Kadatz, Biberach an der Riss, all of Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany

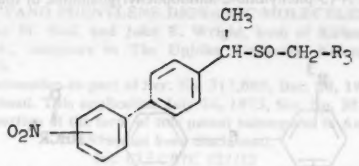
Filed May 14, 1975, Ser. No. 577,169

Claims priority, application Germany, May 20, 1974, 2424475; Jan. 11, 1975, 2500944; Jan. 30, 1975, 2503770; Feb. 26, 1975, 2508243; Feb. 26, 1975, 2508244

Int. Cl.² C07C *149/40*

U.S. Cl. 260—470 2 Claims

1. A compound of the formula



wherein R_3 is (alkoxy of 1 to 6 carbon atoms)-carbonyl; a diastereoisomer thereof; or an optically active antipode thereof.

3,993,684

MONOMERIC COMPOUNDS

William R. Dunnavant, Columbus, Ohio; Edward M. Harris, Webster Groves, Mo.; Philip F. Kurz; Richard A. Markle, both of Columbus, Ohio, and Edward H. Parker, Ballwin, Mo., assignors to Western Litho Plate & Supply Co., St. Louis, Mo.

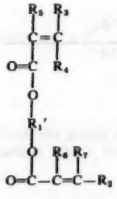
Division of Ser. No. 173,661, Aug. 20, 1971, Pat. No. 3,799,915. This application Aug. 3, 1973, Ser. No. 385,483

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 17, 1976

Int. Cl.² C07C *101/46*

U.S. Cl. 260—471 R **11 Claims**

1. A compound represented by the general formula:



wherein R_1' is selected from the group consisting of alkylene, haloalkylene, alkoxyalkylene, aminoalkylene, cycloalkylene, aralkylene, cycloalkylakylene and aryloxyalkylene groups, R_2 is selected from the group consisting of substituted or unsubstituted aryl groups wherein the substituents are selected from the group consisting of alkyl, methoxy, chloro, bromo and nitro, R_3, R_4 and R_5 are each selected from the group consisting of hydrogen, halogen and lower alkyl, and R_6 and R_7 are each selected from the group consisting of hydrogen, halogen, nitro, lower alkyl, phenyl, phenoxy, and lower alkoxy.

3,993,685

PROCESS FOR THE PRODUCTION OF URETHANES

John G. Zajacek, Devon, and John J. McCoy, Media, both of Pa., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Filed Oct. 21, 1974, Ser. No. 516,316

Int. Cl.² C07C *125/06*

U.S. Cl. 260—471 C **14 Claims**

1. A method for the preparation of urethanes which comprises reacting a hydroxyl group-containing organic compound selected from the group consisting of mono- or polyhydric alcohols and mono- or polyhydric phenols with carbon monoxide and an aromatic, cycloaliphatic or aliphatic mono- or poly-nitro compound at a pressure of between 400 psig and 10,000 psig and at a temperature in the range of about 100° C. to 250° C. in the presence of an effective amount of a catalyst of a mixture of between about 0.005 to 0.20 moles of a platinum group metal or platinum group metal compound and between about 5 to 10 moles of an aliphatic, aromatic or heteroaromatic tertiary amine per mole of said nitro compound, the ratio of the tertiary amine to platinum group metal or platinum group metal compound in the catalyst mixture being between about 1:1 to 25:1 by weight.

3,993,686

PHENYL SUBSTITUTED PROSTAGLANDINS-C-TYPE ANALOGS

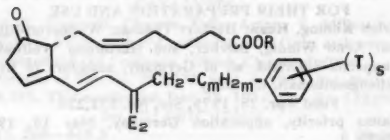
Robert C. Kelly, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Filed Nov. 12, 1973, Ser. No. 415,050

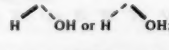
Int. Cl.² C07C *69/76*

U.S. Cl. 260—473 A **12 Claims**

1. An optically active compound of the formula:



or a racemic compound of that formula and the mirror image thereof, wherein R is hydrogen, alkyl of 1 to 12 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, phenyl, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl substituted with 1 to 3 chlorine atoms, inclusive, or phenyl substituted with lower-alkyl of 1 to 4 carbon atoms inclusive; E_2 is



$-C_mH_{2m}-$ is a valence bond or alkylene of 1 to 9 carbon atoms, inclusive, with 1 to 6 carbon atoms, inclusive, in a chain between $-CH_2-$ and the ring; T is lower-alkyl of 1 to 4 carbon atoms, inclusive, fluoro, chloro, trifluoromethyl or $-OR_2$ in which R_2 is hydrogen or lower-alkyl of 1 to 4 carbon atoms, inclusive; and s is 0 to 3 inclusive, with the proviso that not more than two T's are other than alkyl.

3,993,687

RACEMIC FLUORO-SUBSTITUTED PGB$_2$ ANALOGS

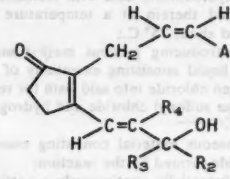
William P. Schneider, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Continuation-in-part of Ser. No. 807,405, March 14, 1969, abandoned. This application Dec. 6, 1974, Ser. No. 530,429

Int. Cl.[2] C07C *177/00*

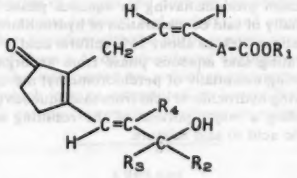
U.S. Cl. 260—468 D 16 Claims

1. A racemic compound of the combination of the formula:



wherein the side-chain hydroxy is in S configuration, and the mirror image of that formula; wherein R_1 is hydrogen, alkyl of one to 8 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, or phenyl substituted with one to 3 chloro or alkyl of one to 4 carbon atoms, inclusive; wherein R_3 is $-(CH_2)_a-CH_3$ wherein *a* is 2, 3, 4, 5, or 6, or $-(CH_2)_d-X$ wherein *d* is zero, one, 2, 3, or 4 and X is isobutyl, tert-butyl, 3,3-difluorobutyl, 4,4-difluorobutyl, or 4,4,4-trifluorobutyl; wherein R_2 and R_4 are hydrogen or alkyl of one to 4 carbon atoms, inclusive; wherein A is $-CH_2-Z-$ wherein Z is ethylene substituted with one or 2 fluoro; and pharmacologically acceptable salts thereof when R_1 is hydrogen.

11. A racemic compound of the combination of the formula:



wherein the side-chain hydroxy is in S configuration, and the mirror image of that formula; wherein R_1 is hydrogen, alkyl of one to 8 carbon atoms, inclusive, cycloalkyl of 3 to 10 carbon atoms, inclusive, aralkyl of 7 to 12 carbon atoms, inclusive, phenyl, or phenyl substituted with one to 3 chloro or alkyl of one to 4 carbon atoms, inclusive; wherein R_3 is $-(CH_2)_d-X$ wherein *d* is zero, one, 2, 3, or 4 and X is 3,3-difluorobutyl, 4,4-difluorobutyl, or 4,4,4-trifluorobutyl; wherein R_2 and R_4 are hydrogen or alkyl of one to 4 carbon atoms, inclusive; wherein A is trimethylene or $-CH_2-Z-$ wherein Z is ethylene substituted with one or 2 fluoro, methyl, or ethyl; and pharmacologically acceptable salts thereof when R_1 is hydrogen.

3,993,688

3-LOWER ALKANOYLOXY-2-(2-PROPENYL)-5-(2-PROPENYL-CARBONYLOXY)-2-CYCLOHEXEN-1-ONES

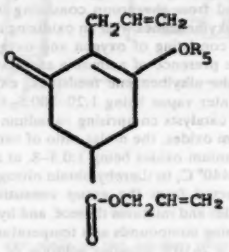
Jane Liu Jernow, Verona, and Perry Rosen, North Caldwell, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 508,131, Sept. 23, 1974, Pat. No. 3,931,234, which is a division of Ser. No. 457,528, April 3, 1974, Pat. No. 3,855,250, which is a division of Ser. No. 317,589, Dec. 22, 1972, abandoned. This application Aug. 14, 1975, Ser. No. 604,521

Int. Cl.[2] C07C *69/74*

U.S. Cl. 260—488 R 2 Claims

1. A compound of the formula:



wherein R_5 is lower alkanoyl.

3,993,689

β-ACYLOXY-CROTONIC ACID AMIDE-N-SULFOHALIDES AND A PROCESS FOR THEIR PREPARATION

Erwin Schmidt, Kelkheim, Taunus; Karl Clauss, Rossert, Taunus; Hartmut Pietsch, Hofheim, Taunus, and Harald Jensen, Frankfurt am Main, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

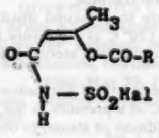
Filed July 16, 1975, Ser. No. 596,218

Claims priority, application Germany, July 18, 1974, 2434547

Int. Cl.[2] C07C *161/00*

U.S. Cl. 260—490 9 Claims

1. A compound of the formula



(III)

in which R represents an alkyl radical having from 1 to 4 carbon atoms and Hal stands for fluorine or chlorine.

3,993,690

METHOD OF OBTAINING AROMATIC TRI-OR-TETRACARBOXYLIC ACIDS

Boris Viktorovich Suvorov, ulitsa Pushkina, 102/44, kv. 27; Dauren Khamitovich Sembaev, ulitsa Furmanova, 91/97, kv. 7; Ivetta Sergeevna Kolodina, 7 Mikroraion, 36, kv. 18, and Lidia Anatolievna Stepanova, ulitsa Pavlova, 16, all of Alma-Ata, U.S.S.R.

Continuation of Ser. No. 22,050, March 23, 1970, abandoned. This application Dec. 22, 1975, Ser. No. 643,111

Claims priority, application U.S.S.R., Mar. 25, 1969, 1313364

Int. Cl.[2] C07C *51/42*

U.S. Cl. 260—524 R 4 Claims

1. A method for the preparation of aromatic tri- or tetracarboxylic acids comprising oxidizing, in the vapor-phase, alkyl benzenes selected from the group consisting of trialkylbenzenes and tetraalkylbenzenes with an oxidizing agent selected from the group consisting of oxygen and oxygen-containing gases, and in the presence of ammonia and water vapor, the molar ratio of the alkylbenzene feedstock, oxidizing agent, ammonia and water vapor being 1:20–100:5–40:30–100, respectively, over catalysts comprising vanadium oxides modified with titanium oxides, the molar ratio of vanadium oxides to modifying titanium oxides being 1:0.5–8, at a temperature of from 350° to 440° C, to thereby obtain nitrogen-containing compounds selected from the group consisting of nitriles, imides, cyanimides and mixtures thereof, and hydrolyzing said nitrogen-containing compounds at a temperature of from 60° to 100° C with a 2–10% aqueous solution of a hydrolyzing agent selected from the group consisting of potassium hydroxide, sodium hydroxide, sulfuric acid and hydrochloric acid.

3,993,691

PROCESS FOR SEPARATION OF MONOCARBOXYLIC ACIDS FROM A MIXTURE OF MONOCARBOXYLIC, HYDROXYCARBOXYLIC AND DICARBOXYLIC ACIDS

Josef Klemens Brunner, Scheuchzerstrasse 47, Zurich, Switzerland

Filed Oct. 21, 1974, Ser. No. 516,658

Claims priority, application Austria, Oct. 22, 1973, 8911/73

Int. Cl.[2] C07C *59/04*

U.S. Cl. 260—535 R 2 Claims

1. In a process for producing useful materials from the waste solution of salts of monocarboxylic acids having 1 to 6 carbon atoms, dicarboxylic and hydroxycarboxylic acids produced in the manufacture of cyclohexanone by the catalytic oxidation of cyclohexane in which said waste salt solution is acidulated with sulfuric acid to produce an aqueous phase which is a concentrated sulfate salt solution and an organic phase and a water-containing mixture of monocarboxylic, hydroxycarboxylic and dicarboxylic acids which phases are thereafter separated, the improved method of distillatively separating the monocarboxylic acids from the water-containing mixture of monocarboxylic, hydroxycarboxylic and dicarboxylic acids of the aforesaid organic phase which comprises the steps of:

subjecting said mixture to a first distillation stage at a temperature below 120° C and at a pressure in the range of 0.1 to 0.3 atm., to obtain a first fraction;

subjecting the remaining mixture to a second distillation stage at a temperature under 120° C at a pressure in the range of 0.002 to 0.02 atm. to obtain a second fraction, and

subjecting the remaining mixture to a third distillation stage at a temperature below 120° C at a pressure in the range of 0.1 to 0.3 atm. with the addition of steam, to obtain a third fraction,

whereby said first, second and third fractions include monocarboxylic acids.

3,993,692

METHANE SULFONYL CHLORIDE AND PROCESS OF PREPARATION

Silvio L. Giolito, Whitestone, and Harry O. Hofmann, Yonkers, both of N.Y., assignors to Stauffer Chemical Company, Westport, Conn.

Continuation of Ser. No. 518,199, Jan. 3, 1966, abandoned. This application Apr. 30, 1969, Ser. No. 824,358

Int. Cl.[2] C07C *143/70*

U.S. Cl. 260—543 R 4 Claims

1. A continuous process for producing methane sulfonyl chloride comprising:

a. maintaining a liquid bath consisting essentially of saturated aqueous hydrochloric acid with methane sulfonyl chloride dispersed therein at a temperature between about 40° C. and about 75° C.;

b. continuously introducing gaseous methyl mercaptan, chlorine and a liquid consisting essentially of water or aqueous hydrogen chloride into said bath for reaction to produce methane sulfonyl chloride and hydrogen chloride;

c. withdrawing gaseous material consisting essentially of hydrogen chloride formed by the reaction;

d. withdrawing substantially continuously a portion of the liquid from said bath and isolating methane sulfonyl chloride therefrom.

3,993,693

METHOD FOR PRODUCING PERCHLOROMETHYL MERCAPTAN

Sudhir K. Bhutani, Orange, Conn., assignor to Olin Corporation, New Haven, Conn.

Filed July 30, 1975, Ser. No. 600,749

Int. Cl.[2] C07C *149/16*

U.S. Cl. 260—543 H 4 Claims

1. In a process for preparing perchloromethyl mercaptan wherein chlorine is passed through a reaction mixture of carbon disulfide and an aqueous solution comprising 5–38% by weight hydrochloric acid with agitation, the improvement which comprises:

a. Adding to said mixture sufficient sulfuric acid to produce a reaction product having an aqueous phase consisting essentially of said concentration of hydrochloric acid and from about 20% to about 55% sulfuric acid,

b. separating said aqueous phase from an organic phase consisting essentially of perchloromethyl mercaptan,

c. removing hydrochloric acid from said aqueous phase and

d. recycling a major portion of the resulting solution of sulfuric acid to said mixture.

3,993,694

TETRACYCLINE DERIVATIVES AND PROCESS FOR PREPARING THEM

Wolfgang Martin, Kelkheim, Taunus; Walter Dürckheimer, Hattersheim, Main, and Elmar Schrinner, Wiesbaden, all of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Germany

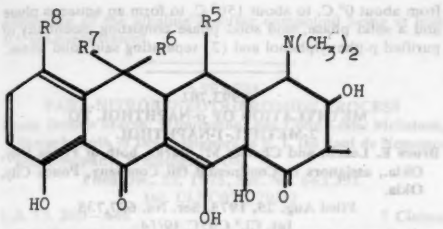
Filed Apr. 11, 1975, Ser. No. 567,115

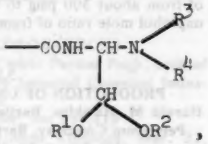
Claims priority, application Germany, Apr. 13, 1974, 2418142

Int. Cl.[2] C07C *103/37*

U.S. Cl. 260—559 AT 10 Claims

1. A tetracycline of the formula





and physiologically tolerated salts thereof, wherein R^1 and R^2 are the same or different and are alkyl having 1 to 5 carbon atoms; R^5 and R^6, taken alone, are the same or different and are hydrogen or hydroxy; R^7, taken alone, is hydrogen or methyl; or R^6 and R^7 taken together are methylene; R^8 is hydrogen, chlorine, bromine or di-lower alkyl amino having 1 to 4 carbon atoms; R^3, taken alone, is alkyl having 1 to 4 carbon atoms having at least one 5- or 6-membered heterocyclic substituent wherein the hetero atom is at least one member selected from the group consisting of oxygen and nitrogen; R^4, taken alone, is hydrogen, alkyl having 1 to 6 carbon atoms, or alkyl having 1 to 6 carbon atoms having at lesst one substituent selected from the group consisting of hydroxy, di-lower alkyl amino, di-lower alkyl carbamoyl, lower alkoxy carbonyl, phenyl, a 5- or 6-membered heterocyclic substituent wherein the hetero atom is at least one member selected from the group consisting of oxygen and nitrogen, cycloalkyl having 5 to 7 carbon atoms, carboxy, and carboxy and amino; and R^3 and R^4, taken together with the nitrogen atom to which they are attached, form a 5- or 6-membered nitrogen heterocycle which may be interrupted by a further nitrogen or oxygen atom and which may be substituted by lower alkyl, hydroxy lower alkyl, carboxy lower alkyl, hydroxy, or carbonyl.

3,993,695

PROCESS FOR THE SEPARATION OF COBALT FROM PRIMARY PRODUCTS OF THE OXO-SYNTHESIS AND RECIRCULATION THEREOF TO THE SYNTHESIS STAGE

Hans Tummes, Oberhausen; Boy Cornils, Dinslaken; Josef Meis, Oberhausen; Dieter Ernst, Oberhausen, and Hans-Joachim Tomuschat, Oberhausen, all of Germany, assignors to Ruhrchemie Aktiengesellschaft, Oberhausen, Germany

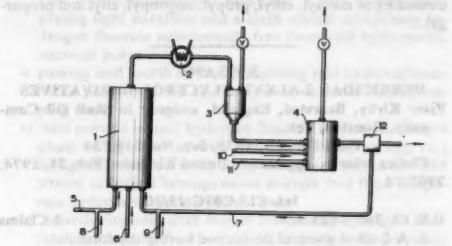
Filed Sept. 13, 1973, Ser. No. 397,045

Claims priority, application Germany, Sept. 16, 1972, 2245565

Int. Cl.² C07C *45/04*

U.S. Cl. 260—604 HF **16 Claims**

1. In a process for the preparation of a primary product consisting of at least one aldehyde by the Oxo-process wherein an olefin, carbon monoxide and hydrogen are reacted under Oxo-process conditions in the presence of a dissolved cobalt carbonyl compound and the resultant reaction mixture is subjected to a steam treatment at a temperature in the range of 100° to 220° C and pressure of between 5 and 30 atmospheres to effect separation of cobalt from said primary products, the improvement for inhibiting precipitation of cobalt



compound of the walls of the reactor prior to said steam treatment which consist of adding a source of sulfur to the sulfur content of the reaction mixture prior to completion of steam treatment so that there is at least 15 mgs. sulfur per kilogram of primary product in the reaction mixture being steam treated.

3,993,696

METHOD FOR RECOVERING HYDROPEROXIDE

Katsumi Kobayashi, Minoo; Iwao Dohgane, Ashiya, and Yukimichi Nakao, Kobe, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Apr. 29, 1974, Ser. No. 465,137

Claims priority, application Japan, May 2, 1973, 48-49407

Int. Cl.² C07C *179/02*

U.S. Cl. 260—610 A **7 Claims**

1. In a method for recovering diisopropylbenzene monohydroperoxide from an oxidation product solution containing unoxidized diisopropylbenzene, diisopropylbenzene monohydroperoxide, diisopropylbenzene dihydroperoxide and oxidation byproducts, which oxidation product solution is prepared by the oxidation of diisopropylbenzene, and successively by the separation of diisopropylbenzene dihydroperoxide from the resulting oxidation product, the improvement which comprises introducing steam into the oxidation product solution at pH 6 to 9 and at a solution temperature of 80° to 130° C under a reduced pressure to obtain a distillate consisting of an aqueous layer and an oil layer comprising diisopropylbenzene monohydroperoxide, and separating the distillate into the aqueous layer and the oil layer.

3,993,697

ODORIFEROUS CYCLOALKYL ACETALS

Klaus Bruns, Krefeld-Traar, and Peter Meins, Mettmann, both of Germany, assignors to Henkel & Cie G.m.b.H., Duesseldorf-Holthausen, Germany

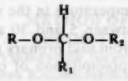
Filed May 29, 1975, Ser. No. 581,783

Claims priority, application Germany, June 7, 1974, 2427500

Int. Cl.² C07C *43/18*

U.S. Cl. 260—611 R **16 Claims**

1. An odoriferous acetal having the formula



wherein R is a cycloalkyl having from 8 to 12 carbon atoms, R_1 is a member selected from the group consisting of hydrogen and methyl, and R_2 is a member selected from the group consisting of methyl, ethyl, propyl, isopropyl, allyl and propargyl.

3,993,698

HERBICIDAL 2-ALKYL GLYCEROL DERIVATIVES

Peter Kirby, Bearsted, England, assignor to Shell Oil Company, Houston, Tex.

Filed Feb. 10, 1975, Ser. No. 548,724

Claims priority, application United Kingdom, Feb. 21, 1974, 7902/74

Int. Cl.² C07C *43/20*

U.S. Cl. 260—611 A **5 Claims**

1. A 2-alkyl glycerol derivative having the formula

wherein R is methyl or ethyl and X is benzyl, 2-chlorobenzyl, 2-fluorobenzyl, 4-fluorobenzyl, or 2-methylbenzyl and Y and Z each is methyl.

3,993,699

PROCESS FOR PRODUCING XYLYLENE GLYCOLS

Satoshi Maeda; Atsushi Kondo, and Shinzi Nishimura, all of Tokyo, Japan, assignors to Hodogaya Chemical Co., Ltd., Tokyo, Japan

Filed Apr. 16, 1975, Ser. No. 568,659

Int. Cl.² C07C *29/00*

U.S. Cl. 260—618 R **9 Claims**

1. In the process for producing a xylylene glycol which comprises reacting a xylylene dichloride with an alkali metal or alkaline earth metal salt of acetic acid in the presence of a catalyst consisting of a tertiary amine in an inert organic solvent to effect esterification, removing the by-product inorganic chloride and the catalyst from the resulting diacetoxymethylbenzene solution and then saponifying the diacetoxymethylbenzene with an aqueous alkali solution to obtain the corresponding xylylene glycol, the improvement comprising using as said inert organic solvent at least one member selected from the group consisting of benzene, toluene, xylene and monochlorobenzene, separating the reaction liquid after the completion of saponification into an aqueous solution layer containing the xylylene glycol formed and a solvent layer, and recovering the xylylene glycol from said aqueous solution layer with at least one extraction solvent selected from the group consisting of ethyl acetate and n-butyl acetate.

3,993,700

PURIFICATION OF P-PHENYLPHENOL

William E. Smith, and Irvin W. Potts, Jr., both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Feb. 20, 1973, Ser. No. 333,863

Int. Cl.² C07C *37/44*

U.S. Cl. 260—620 **11 Claims**

1. The process for purifying p-phenylphenol in a mixture comprising p-phenylphenol containing about 30% or less m-phenylphenol based on the total weight of the phenylphenols, comprising (1) contacting with mixing, said mixture with an aqueous caustic solution of from about 0.5 to about 10 moles of caustic per mole of m-phenylphenol at a temperature of from about 0° C. to about 150° C. to form an aqueous phase and a solid phase, said solid phase consisting essentially of purified p-phenylphenol and (2) separating said solid phase.

3,993,701

METHYLATION OF α-NAPHTHOL TO 2-METHYL-1-NAPHTHOL

Bruce E. Leach, and Charles M. Starks, both of Ponca City, Okla., assignors to Continental Oil Company, Ponca City, Okla.

Filed Aug. 25, 1975, Ser. No. 607,735

Int. Cl.² C07C *39/14*

U.S. Cl. 260—621 R **6 Claims**

1. A process for the production of 2-methyl-1-naphthol comprising reacting alpha-naphthol with methanol in liquid phase over alumina catalysts, wherein the reaction is carried out at a temperature of from about 320° C to 380° C, pressures of from about 300 psig to 500 psig, and a methanol/alpha-naphthol mole ratio of from about 0.1 to about 1.0.

3,993,702

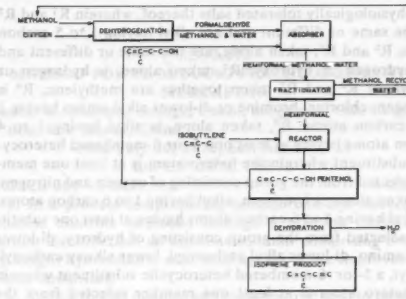
PRODUCTION OF UNSATURATED ALCOHOLS

Harold M. Hawkins, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Sept. 29, 1975, Ser. No. 617,755

Int. Cl.² C07C *29/00*

U.S. Cl. 260—632 B **15 Claims**



1. A method for forming alkenols which comprises the steps:

a. oxidizing a lower alkanol at least in part to the corresponding lower alkanol,

b. contacting said lower alkanol with an alkenol thereby forming a hemialdehyde,

c. contacting said hemialdehyde with an alkene, thereby forming said alkenol,

d. recycling a portion of said alkenol to said contacting step (b).

3,993,703

PREPARATION OF 2-HYDROCARBYLGLYCEROLS

Arend Reinink, and Jennigje Grendelman, both of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed Aug. 21, 1975, Ser. No. 606,674

Claims priority, application United Kingdom, Sept. 5, 1974, 38836/74

Int. Cl.² C07C *29/00*

U.S. Cl. 260—635 P **10 Claims**

1. A process for the preparation of a 2-alkylglycerol which comprises reacting at a temperature in the range of from 10° C to 200° C a 2-haloalkanal having a secondary carbon atom in the 2-position with formaldehyde and an alkaline reacting compound in the presence of an aqueous medium, the con-

centration of the alkaline reacting compound being at least 0.5 gram-equivalent.

3,993,704

PARA-NITROBENZOTRIBROMIDE PROCESS

Frank Dennis Marsh, Wilmington, and Colin Leslie McIntosh, Newark, both of Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Dec. 22, 1975, Ser. No. 643,391

Int. Cl.² C07C *79/12*

U.S. Cl. 260—646 **7 Claims**

1. In the conversion of p-nitrobenzal bromide to p-nitrobenzotribromide, by reaction with an alkali or alkaline earth metal hypobromite, the improvement which comprises carrying out the reaction in a two-phase, water-organic solvent system.

3,993,705

CHLORINATED HYDROCARBONS

Ian Stuart McColl, and Ashley Cedric Pardoe Pugh, both of Runcorn, England, assignors to Imperial Chemical Industries Limited, London, England

Filed Mar. 7, 1975, Ser. No. 556,419

Claims priority, application United Kingdom, Mar. 22, 1974, 12799/74

Int. Cl.² C07C *21/08*

U.S. Cl. 260—654 D **12 Claims**

1. A process for the removal of dichloroacetylene impurities from impure vinylidene chloride which comprises treating the said impure vinylidene chloride with a solution of a compound selected from the group consisting of a sulphide, polysulphide or hydrosulphide of ammonia or of a metal in Group IA or IIA of the Periodic Table or a mixture of two or more thereof.

3,993,706

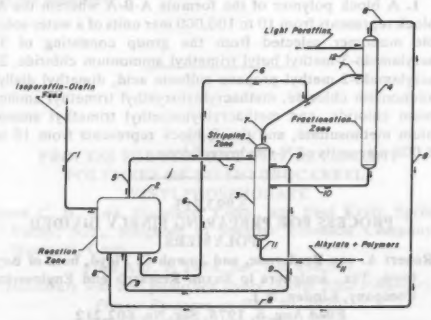
ACID PURIFICATION AND RECYCLE IN HF-CATALYZED ALKYLATION

Michael Z. Mikulicz, Palatine, and Vance P. Burton, Arlington Heights, both of Ill., assignors to UOP Inc., Des Plaines,, Ill.

Filed Oct. 28, 1975, Ser. No. 626,529

Int. Cl.² C07C *3/54*

U.S. Cl. 260—683.48 **7 Claims**



1. A process for the HF-catalyzed alkylation of an isoparaffin with an olefin to produce an alkylate product, which process comprises the steps of:

i. reacting said isoparaffin with said olefin, in the presence of a hydrogen fluoride alkylation catalyst comprising hydrogen fluoride containing hydrocarbonaceous polymers, in a reaction zone;

ii. separating a hydrocarbon phase and a catalyst phase from step (i);

iii. passing said hydrocarbon phase to a stripping zone operated at conditions selected to withdraw a first stream comprising alkylate product including said hydrocarbonaceous polymers, a second stream comprising unreacted isoparaffins and a third stream comprising hydrogen fluoride and light paraffins;

iv. passing said third stream comprising hydrogen fluoride and light paraffins and a portion of said catalyst phase, as hereinafter delineated to a fractionation zone operated at conditions selected to provide a fourth stream comprising said hydrocarbonaceous polymers, a fifth stream comprising light paraffins and a sixth stream comprising hydrogen fluoride substantially free from said hydrocarbonaceous polymers;

v. passing said fourth stream comprising said hydrocarbonaceous polymers from said fractionation zone to said stripping zone;

vi. said portion of said hydrogen fluoride alkylation catalyst phase being admixed with said third stream in step (iv) being sufficient to completely dissolve within said third stream to form a homogeneous mixture free from a separate hydrogen fluoride phase; and,

vii. introducing said sixth stream comprising hydrogen fluoride substantially free from hydrocarbonaceous polymers into said reaction zone.

3,993,707

COMPOSITION FOR COATING WET SURFACES OR SURFACES IMMERSED IN WATER

Lowell O. Cummings, San Anselmo, Calif., assignor to Pacific Vegetable Oil Corporation, San Francisco, Calif.

Continuation-in-part of Ser. No. 408,453, Oct. 23, 1973, abandoned, which is a division of Ser. No. 196,778, Nov. 8, 1971, abandoned, which is a continuation-in-part of Ser. No. 157,638, June 28, 1971, abandoned. This application Mar. 7, 1975, Ser. No. 556,385

Int. Cl.² C08G *45/06*

U.S. Cl. 260—830 TW **11 Claims**

1. A coating composition capable of being applied on and adhering to a wet surface or object, consisting essentially of an intimate mixture of:

A. an epoxy resin free of water and of unreactive solvents for said resin consisting of a polyepoxide having a plurality of vic-epoxy groups and containing only members of the group consisting of carbon, hydrogen, oxygen and, chlorine, and

B. a substantially stoichiometric amount of an amine curing agent which is substantially insoluble in water and not water-sensitive and is a condensation product of a small proportion of a polyepoxide having a plurality of vic-epoxy groups and containing only members of the group consisting of C, H, O, and Cl, and a large proportion of a fatty amine of the formula:

$$R_3-\underset{\underset{H}{|}}{N}-CH_2-CH_2-CH_2-NH_2$$

where R_3 is chosen from the group consisting of alkylradicals having at least eight carbon atoms and alkyl ether radicals of which one of the alkyl radicals has at least eight carbon atoms.

3,993,708

ELASTIC HARDENED EPOXY RESIN POLYMERS

Bernd Brinkmann, Bad Zwischenahn, and Bernd Neffgen, Cappenberg, both of Germany, assignors to Schering Aktiengesellschaft, Berlin and Bergkamen, Germany

Filed Apr. 1, 1975, Ser. No. 563,970

Claims priority, application Germany, Apr. 13, 1974, 2418041

Int. Cl.² C08L *63/00*

U.S. Cl. 260—830 P **11 Claims**

1. In the method of hardening a liquid epoxy resin having more than one epoxy group per molecule with an approximately stoichiometric amount of an amine hardener, the im-

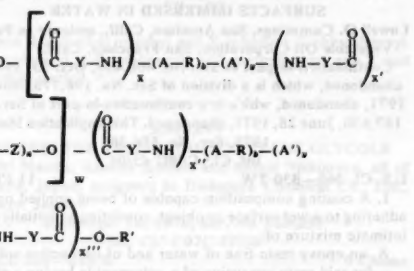
provement wherein said amine hardener is the amino-terminated hydrolysis product of an adduct having terminal enamine or ketimine groups, whereby an elastic hardened polymer is obtained, said adduct being prepared by reacting a polyalkylene ether polyol having a molecular weight from 500 to 10,000 with a polyisocyanate in amounts such that the ratio of NCO groups to OH groups is from 1.5:1 to 2.5:1 to form a polyether urethane, and then reacting said polyether urethane with an enamine or ketimine containing an hydroxy group in amounts such that the ratio of NCO groups to OH groups is 1:1.

3,993,709
POLYESTER INITIATED ANIONIC CATALYZED POLYMERIZATION OF LACTAM

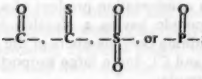
Ross M. Hedrick, Creve Coeur, and James D. Gabbert, St. Louis, both of Mo., assignors to Monsanto Company, St. Louis, Mo.

Division of Ser. No. 482,532, June 24, 1974, Pat. No. 3,944,629. This application Nov. 7, 1975, Ser. No. 629,823
Int. Cl.² C08L 77/00; C08G 69/44
U.S. Cl. 260—857 PE **14 Claims**

1. A lactam-polyol-polyacyl lactam block terpolymer or a lactam polyol-acyl-polylactam block terpolymer having ester end group termination and the general formula:



where $(O-Z)_a$ is a polymeric moiety and Z is a hydrocarbon or substituted hydrocarbon group said group being alkylene, arylene, alkylene carbonyl, arylene carbonyl, and mixtures thereof; A and A′ are acyl groups selected from



R is a divalent or polyvalent hydrocarbon group;
Y is an alkylene or substituted alkylene having from about 3 to about 14 carbon atoms; x, x', x'', and x''' are integers and the total number of x's is equal to $2w + 2$; n, y, and w are integers equal to one or more, and b is an integer equal to zero or one; and R′ is an aliphatic or substituted aliphatic hydrocarbon wherein the ester group is attached to other than an aromatic radical.

3,993,710
POLYMERIZABLE ORGANIC DISPERSIONS

Heinrich Alberts, Cologne; Klaus Schuster, Opladen; Herbert Bartl, Odenthal-Hahnenberg, and Hansjochen Schulz-Walz, Krefeld, all of Germany, assignors to Bayer Aktiengesellschaft, Germany

Filed June 24, 1975, Ser. No. 589,949
Claims priority, application Germany, June 29, 1974, 2431410; Oct. 18, 1974, 2449581
Int. Cl.² C08L 23/08, 67/06
U.S. Cl. 260—862 **5 Claims**

1. A composition comprising
I. 5–76% by weight of an α,β-ethylenically unsaturated polyester,
II. 20–70% by weight of an ethyienically unsaturated copolymerizable monomer and
III. 4–25% by weight of an ethylene copolymer derived from
a. 15–99% by weight of ethylene,
b. 1–20% by weight of an unsaturated sulfonic acid, an α,β-unsaturated monocarboxylic or dicarboxylic acid having 2 to 8 carbon atoms, an ester, half ester, amide or half amide of one of said acids, a salt thereof or an oxethylated derivative thereof and
c. 0–65% by weight or an ethylenically unsaturated copolymerizable monomer.

3,993,711
CARBOXYLATED POLY(ARYLACETYLENES)

Aron S. Watson, New Castle, Del., assignor to Hercules Incorporated, Wilmington, Del.

Filed Mar. 19, 1975, Ser. No. 559,867
Int. Cl.² C08F 38/00, 138/00, 238/00
U.S. Cl. 260—874 **4 Claims**

1. A thermosetting composition comprising a blend of a prepolymer (A) of at least one polyacetylenically substituted aromatic compound and from about 2 to about 25% by weight of a carboxylated prepolymer (B) obtained by oxidation of said prepolymer (A), both of said prepolymers (A) and (B) having a number average molecular weight of from about 900 to about 12,000, a ratio of aromatic protons to olefinic protons greater than about 2.4 and from about 5 to about 20% by weight of terminal acetylenic groups attached to the aromatic rings of said prepolymers, and said prepolymer (B) additionally having from about 0.1 to about 5% by weight of carboxyl groups attached to the aromatic rings of said prepolymer.

3,993,712
WATER-SOLUBLE VINYL-PYRROLIDONE BLOCK COPOLYMERS

Lawrence James Guilbault, Topsfield, Mass., assignor to Calgon Corporation, Pittsburgh, Pa.

Division of Ser. No. 465,660, April 30, 1974, Pat. No. 3,907,927. This application June 6, 1975, Ser. No. 584,552
Int. Cl.² C08F 15/00, 45/24
U.S. Cl. 260—875 **3 Claims**

1. A block polymer of the formula A-B-A wherein the A block represents from 10 to 100,000 mer units of a water-soluble monomer selected from the group consisting of 3-acrylamido-3-methyl butyl trimethyl ammonium chloride, 2-acrylamido-2-methyl propane sulfonic acid, dimethyl diallyl ammonium chloride, methacryloyloxyethyl trimethyl ammonium chloride, and methacryloyloxyethyl trimethyl ammonium methosulfate, and the B block represents from 10 to 5,000 mer units of N-vinylpyrrolidone.

3,993,713
PROCESS FOR PREPARING FINELY DIVIDED POLYMERS

Robert A. van Brederode, and Joseph C. Floyd, both of Baytown, Tex., assignors to Exxon Research and Engineering Company, Linden, N.J.

Filed Aug. 6, 1975, Ser. No. 602,212
Int. Cl.² C08F 6/12
U.S. Cl. 260—878 R **16 Claims**

1. A process for producing high density fine polymer powder comprising
heating a solution of a solvent and a polymer and,
atomizing said solution into a drying atmosphere,
wherein the improvement comprises having an amount of polymer in solution in said solvent, the viscosity of the solution of solvent and polymer being no greater than 5 centipoise at the temperature of atomization, whereby the formation of droplets of polymer is not inhibited at the temperature of said drying atmosphere,

said solvent having a vapor pressure in the range of about 50 to 400 mm of Hg at the temperature of the drying atmosphere.

3,993,714
ELASTOMER

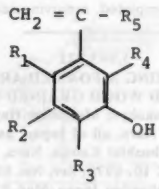
Shuichi Kanagawa, Osaka, and Tamotsu Miki, Ichihara, both of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Dec. 5, 1974, Ser. No. 529,938
Claims priority, application Japan, Mar. 22, 1974, 49-32766
Int. Cl.² C08L 9/00
U.S. Cl. 260—880 R 6 Claims

1. A modified elastomer having a phenolic hydroxyl group on the side chain characterized in that the modified elastomer is obtained by graft-copolymerizing

an elastomer prepared by polymerizing at least one monomer selected from the group consisting of conjugated dienes, unsaturated nitriles, monovinyl aromatic hydrocarbons, unsaturated carboxylic acids and their esters, vinyl esters and monoolefins

with a phenolic monomer represented by the formula



wherein R_1, R_2, R_3, R_4 and R_5 are individually an alkyl group or a hydrogen atom and the phenolic monomer is present in an amount of 0.5 to 10 parts by weight per 100 parts by weight of the elastomer.

3,993,715
PROCESS FOR FORMING FIRE RETARDANT POLYMERS OF BIS (HYDROCARBYL) VINYLPHOSPHONATE

Jesse C. H. Hwa, Stamford, Conn., and Paul Kraft, Spring Valley, N.Y., assignors to Stauffer Chemical Company, Westport, Conn.

Filed Apr. 1, 1974, Ser. No. 456,579
Disclosure was also published under second Trial Voluntary Protest Program on Feb. 10, 1976
Int. Cl.² C08L 27/06, 27/08, 27/10
U.S. Cl. 260—884 15 Claims

1. In a process for forming a polymer of a bis(hydrocarbyl) vinylphosphonate comprising the steps of forming a polymerization medium containing a bis(hydrocarbyl) vinyl phosphonate monomer and polymerizing saiad monomer, wherein the improvement comprises adding a monoethylenically unsaturated monomer selected from the group consisting of the vinyl and vinylidene chlorides and bromides to the polymerization medium only when the percent conversion of monomer therein is 40% or greater and residual unreacted vinylphosphonate monomer remains.

3,993,716
ACRYLATE COMPOSITIONS

Dieter H. Klein, Clute, and Russell H. Cramm, Lake Jackson, both of Tex., assignors to Dow Badische Company, Williamsburg, Va.

Filed Sept. 22, 1970, Ser. No. 74,472
Int. Cl.² C08L 31/00, 51/00
U.S. Cl. 260—885 4 Claims

1. The method of making a coating composition comprising a stabilized vinyl polymer in dispersion form comprising the steps of

A. Forming an acrylic-graft copolymer stabilizer by

A1. free radical solution polymerization of at least one fatty acrylic or methacrylic monomer containing 8–22 carbon atoms, and (2-(1-aziridinyl)-ethylmethacrylate to form a backbone in an organic medium which solvates the polymer; and

A2. opening the aziridinyl ring by addition of a proton donating or proton accepting polymerizable monomer; and

A3. grafting an insoluble sidechain onto the backbone resulting from A2.

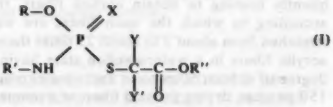
B. Copolymerizing vinyl monomers containing at least one of the monomers used in A3 in the presence of said stabilizer.

3,993,717
S-(ALKOXYCARBONYL)-ALKYL-THIOPHOSPHORIC ACID ESTER AMIDES

Claus Stolzer, Wuppertal; Wolfgang Behrenz, and Ingeborg Hammann, both of Cologne, all of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Germany

Filed Aug. 8, 1973, Ser. No. 386,673
Claims priority, application Germany, Aug. 16, 1972, 2240033
Disclosure was also published under second Trial Voluntary Protest Program on Feb. 3, 1976
Int. Cl.² C07F 9/24; A01N 9/36
U.S. Cl. 260—942 8 Claims

1. An S-(alkoxycarbonyl)-alkyl-thiophosphoric acid ester amide of the formula



(I)

in which

R, R′ and R″ each independently is alkyl of 1 to 10 carbon atoms or lower alkenyl,

Y is hydrogen or lower alkyl,

Y′ is hydrogen, lower alkyl or $—CH_2—CO—OR''$, and

X is oxygen or sulfur.

3,993,718
METHOD OF MANUFACTURING AN ARTIFICIAL PAPER

Walter Bontinck, St. Martens-Leerne, and Willy De Coster, Gent, both of Belgium, assignors to U.C.B., Societe Anonyme, Belgium

Continuation-in-part of Ser. No. 428,743, Dec. 12, 1973, Pat. No. 3,882,061, which is a division of Ser. No. 158,060, June 29, 1971, Pat. No. 3,876,735. This application Jan. 6, 1975, Ser. No. 538,777
Claims priority, application Belgium, July 3, 1970, 2327
Int. Cl.² B29C 25/00; C08K 3/00
U.S. Cl. 264—22 19 Claims

1. A process for the manufacture of artificial paper requiring neither calendering nor biorientation, which comprises homogenizing in a conventional rotary mixer a composition containing:

30 to 94.8% by weight of at least one rigid polyolefin (A) selected from the group consisting of homopolymers and copolymers of ethylene, propylene, and butylene, and also mixtures thereof, and having a melt index of at most 1 dg./min.

0.1 to 35% by weight of at least one polymer (B) which is incompatible with the rigid polyolefin (A and which when extruded by itself produces a brittle film and which has a melt index lower than 10 dg./min., the polymer (B) being selected from the group consisting of homopolymers and copolymers containing a preponderant amount of styrene;

0.1 to 35% by weight of a macromolecular material (C) producing compatibility between (A and (B) which is a mixture prepared in advance by melting and mixing together at least one homopolymer of ethylene, propylene or butylene, and at least one homopolymer of isobutylene, butadiene or isoprene, or butyl rubber, said material (C) having a melt index of at most 2 dg./min.;

5 to 45% by weight of an inorganic filler (D) having a particle size lower than 50 microns;

0 to 10% by weight of adjuvants (E) selected from the group consisting of antioxidizing agents, thermal stabilizers, optical bleaching agents, pigments, coloring materials, antistatic agents, and lubricants; the mixture thus homogenized being subjected to extrusion to obtain an artificial paper, and the artificial paper thus obtained, if desired, being subjected to surface treatment.

3,993,719

PROCESS FOR PRODUCING CARBON FIBERS

Yasuo Matsumura; Soichiro Kishimoto, and Masahiko Ozaki, all of Okayama, Japan, assignors to Japan Exlan Company Limited, Osaka, Japan

Filed Jan. 31, 1975, Ser. No. 546,178
Claims priority, application Japan, Feb. 15, 1974, 49-18266
Int. Cl.² C01B *31/07*
U.S. Cl. 264—29.1 **14 Claims**

1. In a process for producing carbon fibers which comprises spinning acrylic fibers from an inorganic solvent solution of an acrylonitrile homopolymer or copolymer containing at least 85 mol percent acrylonitrile, drying the fibers and subsequently heating to obtain carbon fibers, the improvement according to which the spun fibers are water-washed and stretched from about 3 to about 25 times their length to obtain acrylic fibers in a water-swollen state having an orientation degree of at least 50 percent and a water content of from 5 to 150 percent, drying the said fibers at a temperature below 70° C to reduce the water content therein to below 4 percent and subsequently heating the fibers to obtain carbon fibers.

3,993,720

PROCESS AND APPARATUS FOR FORMING MODULAR BUILDING STRUCTURES

Harold D. Burdett, 3802 Grandview, Tempe, Ariz. 85282

Filed Sept. 30, 1974, Ser. No. 510,507
Int. Cl.² E04B *1/16*
U.S. Cl. 264—33 **5 Claims**

1. A method of forming a multi-story building formed from similar hollow core castings comprising the steps of:

placing an expandable and collapsible form for forming the inner core of a hollow concrete structure in place in a predetermined position,

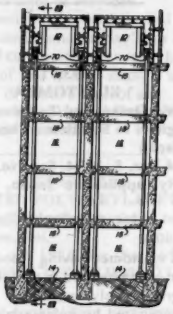
forming and curing a pliable concrete mass around the sides and top of said core,

collapsing and removing said core from around the cured concrete mass,

positioning a first group of ground supported supports vertically within said mass so as to extend through said top of said mass a given distance,

mounting roller means on the top ends of said first group of supports,

raising said core above the top of said mass and positioning it on said roller means and moving it over said top until it is in position over said cured mass to be used to form a contiguous hollow core casting on top of the cured concrete mass,



said supports, solely supporting the weight of the form thereby avoiding loading of the cured concrete mass prematurely,

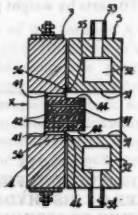
forming and curing a second pliable concrete mass around the sides of said core contiguous with the sides of said cured concrete mass and on top of said core, and when the building is completed, removing said supports.

3,993,721

METHOD OF FORMING A FOAMED ARTICLE HAVING A SIMULATED WOOD GRAINED SURFACE

Shigenari Soda, Nagaokakyo; Motoshige Hayashi, Ikoma, and Shigetoshi Tanaka, Nara, all of Japan, assignors to Sekisui Kaseihin Kogyo Kabushiki Kaisha, Nara, Japan

Filed Mar. 10, 1975, Ser. No. 557,024
Claims priority, application Japan, Mar. 9, 1974, 49-27354
Int. Cl.² B29D *7/02, 27/00;* B29F *3/08*
U.S. Cl. 264—45.5 **8 Claims**



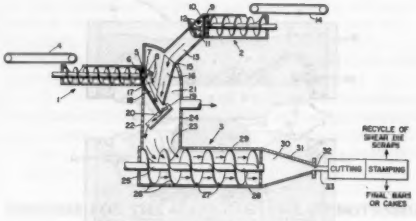
1. In a process for preparing a foamed article of thermoplastic resin having a straight wood grain pattern on the surface thereof wherein a melt of foamable thermoplastic resin is extruded through a die having a resin discharge plate with plural rows of plural apertures to form, upon extrusion, a plurality of resin members which are thereafter passed through a cooling zone and coalesced to form the foamed article, the improvement comprising: extruding said foamable thermoplastic resin through a resin discharge plate having an apertured peripheral resin discharge portion and an apertured interior resin discharge portion such that said interior discharge portion extends beyond said peripheral discharge portion in the direction of extrusion to form first extruded peripheral resin members and second extruded inner resin members, aperture density in said peripheral resin discharge portion being 1.5 to 5 times greater than aperture density in said interior resins discharge portion; and immediately passing the

extruded peripheral resin members from said apertured peripheral resin discharge portion through a cooling frame extending longitudinally in the direction of extrusion, said frame being positioned in peripheral contact with said peripheral discharge portion in such a manner as to restrict lateral expansion of said peripheral resin members, said cooling frame forming an extension of the die, causing said peripheral extruded members to exit from the peripheral resin discharge portion into restrictive contact with the cooling frame and to pass through at least a portion of the cooling frame and thereafter coalescing the still softened peripheral resin members with the inner resin members being discharged through said apertured inner resin discharge portion.

3,993,722
PROCESS FOR MAKING VARIEGATED SOAP BARS OR CAKES

Thomas A. Borcher, Elsmere, Ky., and John R. Knochel, Blue Ash, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Jan. 31, 1975, Ser. No. 546,053
Int. Cl.² B29F *3/12*
U.S. Cl. 264—75 **9 Claims**



1. A process for making variegated soap bars, said process comprising:

a. providing at least two colored soap masses at a temperature and consistency suitable for plodding, there being soap masses of at least two different colors;

b. plodding and extruding the soap masses to form,

i. at least one stream of small diameter noodles of one color, the small diameter noodles having diameters of about ⅛ inch or less, and

ii. at least one stream of larger diameter noodles of a second color, the larger diameter noodles having diameters at least about twice as great as those of the small diameter noodles;

c. introducing the streams of the small and larger diameter noodles into a vacuum chamber at respective rates such that the weight rate of the small diameter noodles is from about 2 to about 6 times that of the larger diameter noodles;

d. directing together the streams of small and larger diameter noodles so as to achieve commingling of the noodles before they exit from the vaccum chamber;

e. introducing the commingled noodles into a final flodder;

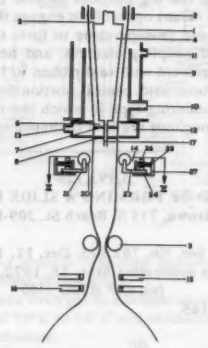
f. plodding the commingled noodles in the final plodder into a variegated soap log; and

g. forming the log into variegated soap bars.

3,993,723
COOLING THERMOPLASTIC TUBES

John Brian Davis; Derek Skilling, and Nigel Edwin Wrigley, all of Dumfries, Scotland, assignors to Imperial Chemical Industries Limited, London, England

Filed June 17, 1974, Ser. No. 480,273
Claims priority, application United Kingdom, July 2, 1973, 31404/73
Int. Cl.² B29D *23/04*
U.S. Cl. 264—95 **6 Claims**

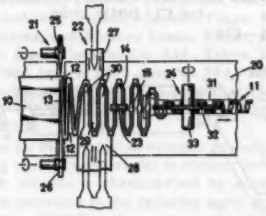


1. A method of cooling an extruding tube of thermoplastic material comprising feeding the tube, in the direction of extrusion, in heat-transfer relationship with an adjacent cooling surface, maintaining said cooling surface at a temperature below the melting point of the thermoplastic material to solidify the tube, maintaining a sheath of a heat-transfer fluid between, and in contact with, the tube and said cooling surface, and applying a transverse thrust to the solidified tube surface, at a position downstream of said cooling surface, more effectively to cool a selected area of the extruding tube by displacing the tube transversely of the direction of extrusion to decrease the thickness of the fluid sheath between the selected area and the cooling surface.

3,993,724
APPARATUS FOR THE MANUFACTURE OF CONTINUOUS COUPLING ELEMENTS FOR SLIDE FASTENERS

Ikuo Takamatsu, No. 3671, Nomura, Daikaiji, Uozu, Toyama, Japan

Filed Dec. 27, 1974, Ser. No. 536,825
Claims priority, application Japan, Dec. 29, 1973, 49-2383
Int. Cl.² B29C *17/02;* B29D *7/24*
U.S. Cl. 264—138 **3 Claims**



1. An apparatus for the manufacture of a continuous coupling element of the meandering type for a slide fastener, which apparatus comprises cutter means operable to form, in an indexedly moved, generally flat, strip of stock material, a

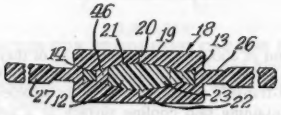
series of transverse cuts of predetermined length less than the width of the strip, said cutter means forming said cuts alternately from opposite sides of the strip to convert said strip into a continuous, expanded ribbon of zigzag configuration, the central portion of said expanded ribbon being substantially in alignment with the central portion of said strip and corresponding to the coupling head portion of the finished coupling element; first forming means including a pair of forming dies positioned on respective opposite sides of said ribbon and operable to engage said ribbon to reshape the side portions thereof to form the leg portions of said coupling element; second forming means operable to engage the central portion of said ribbon and reshape same to form the coupling head portions of said coupling element; and bending means disposed for engagement with said ribbon to bend the side portions thereof about said central portion to form a coupling element of meandering type in which the respective leg and coupling head portions are in a U-shaped configuration.

3,993,725

METHOD OF FORMING A SLIDE FASTENER

Alexander M. Brown, 715 S. Beach St. 309-D, Daytona Beach, Fla. 32014

Division of Ser. No. 782,973, Dec. 11, 1968, Pat. No. 3,711,903. This application Mar. 15, 1972, Ser. No. 234,809
Int. Cl.² B29D *5/00*
U.S. Cl. 264—145 **28 Claims**



1. The method of forming an interdigitating fastener comprising the steps of:

extruding a core strip of relatively hard material;

slitting said core strip to define a single longitudinally extending serpentine slit fully therethrough defining interdigitated core strip portions;

extruding a carrier strip of relatively soft material about said interdigitated slit core strip;

slitting said interdigitated carrier strip in overlying relationship to said serpentine core strip slit; and

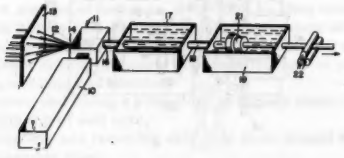
separating the carrier strip along the slit to concurrently separate said core strip portions.

3,993,726

METHODS OF MAKING CONTINUOUS LENGTH REINFORCED PLASTIC ARTICLES

Richard L. Moyer, Newark, Del., assignor to Hercules Incorporated, Wilmington, Del.

Filed Jan. 16, 1974, Ser. No. 433,983
Int. Cl.² D01D *13/06*
U.S. Cl. 264—174 **7 Claims**



1. A method of making reinforced plastic articles comprising:

advancing one or more continuous length rovings of temperature resistant material into a crosshead extruder die;

forcing molten polymer into said die under relatively high pressure to impregnate said rovings; cross-section;

continuously extruding and pulling said impregnated rovings through one or more exit orifices of said die to consolidate and shape said impregnated rovings into an article having a substantially uniform cross-section:

at least partially cooling said article to harden the outer surface thereof; and

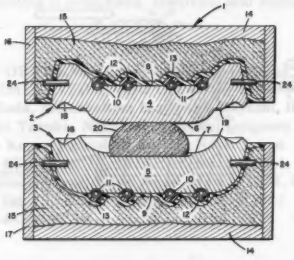
compressing said article during cooling to remove voids therein and provide a uniform cross-section wherein said rovings comprise between about 30% to 90% by weight of said article.

3,993,727

FLUID-RELEASE MOLD AND THE METHOD OF MANUFACTURING THE SAME

Rudolph A. Skriletz, Marysville, and Virgil D. Kendall, Springfield, both of Ohio, assignors to Wallace-Murray Corporation, New York, N.Y.

Continuation of Ser. No. 533,960, Dec. 18, 1974, abandoned, which is a continuation of Ser. No. 346,291, March 30, 1973, abandoned. This application Dec. 3, 1975, Ser. No. 637,236
Int. Cl.² B29C *1/02*
U.S. Cl. 264—225 **28 Claims**



1. A method of manufacturing a fluid-release mold comprising the steps of:

providing a preformed, porous mold body made from an alumina containing ceramic material fired to a point short of the theoretical density for said material; said preformed mold body having a mold face formed on a first exterior surface therof;

disposing a flexible, tubular, fluid-permeable conduit externally on a second exterior surface of said preformed mold body such that the externally disposed conduit has a first wall portion contiguous with said second exterior surface and a non-contiguous second wall portion free of contact with said preformed mold body; said contiguous first wall portion of the fluid-permeable conduit being in fluid communication substantially continuously along the entire length thereof with said second exterior surface of the preformed mold body, whereby fluid from said flexible conduit may pass therefrom into the porous mold body, and

covering said non-contiguous second wall portion of the fluid-permeable conduit and sealing the conduit to the mold body with a fluid-impermeable, adhesive, resinous material whereby the conduit is secured to the mold body and egress of fluid from said conduit is prevented except through the mold body.

3,993,728

BIDENTATE ORGANOPHOSPHORUS SOLVENT EXTRACTION PROCESS FOR ACTINIDE RECOVERY AND PARTITION

Wallace W. Schulz, Richland, Wash., assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Aug. 27, 1975, Ser. No. 608,378
Int. Cl.² B01D *11/00*
U.S. Cl. 423—9 **12 Claims**

1. A liquid-liquid extraction process for the recovery and partitioning of actinide values selected from the group consisting of Am (III), Cm (III), Pu (IV), Np (IV) and U (VI), from acidic nuclear waste aqueous solutions comprising the steps of contacting said aqueous solutions with a bidentate organophosphorous extractant selected from the group consisting of methylene diphosphonates, carbamylphosphonates, and carbamylmethylene diphosphonates to thereby extract said actinide values into the organic phase, contacting said actinide-loaded organic phase with an aqueous dilute about 0.1M nitric acid solution to extract the trivalent actinide values into the aqueous phase, contacting the organic phase containing the tetravalent and hexavalent actinide values with an aqueous solution of about 0.1M nitric-hydrofluoric acid to thereby extract the tetravalent actinide values into the aqueous phase and thereafter contacting the organic phase containing the hexavalent actinide values with a dilute solution of sodium carbonate to thereby remove the hexavalent actinide values from said organic phase.

3,993,729

PROCESS FOR THE MANUFACTURE OF POTASSIUM PHOSPHATES

Joseph Epstein; Eli Mosche Feist, and Daniel Altaras, all of Beer-Sheva, Israel, assignors to Dead Sea Works Ltd., Beer Sheva, Israel

Filed Jan. 16, 1974, Ser. No. 433,977
Claims priority, application Israel, Jan. 22, 1973, 41356
Int. Cl.² C01D *0/00*; C01B *15/16, 25/26*
U.S. Cl. 423—184 **21 Claims**

1. A process for the production of potassium phosphates from potassium bearing brines comprising the steps of

a. selectively precipitating the potassium in the form of an insoluble or slightly soluble salt, wherein the agent used to precipitate the potassium from its brines is an anion A^- characterized by that

i. the potassium salt KA of said anion is only slightly soluble in water or saline solutions, whereas those of sodium, calcium and magnesium are very soluble, and

ii. the anion A^- has a higher affinity than the phosphate ions $H_2PO_4^-$ and HPO_4^{--} for liquid anion exchangers; and

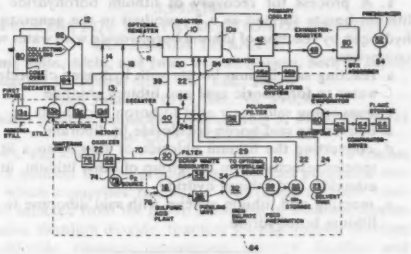
b. thereafter converting said salt to potassium phosphate by reacting said salt with phosphoric acid in at least one step of liquid anion exchange, wherein an organic amine extractant is used in said liquid anion exchange in combination with a liquid inert organic diluent which is immiscible with water and is compatible with said amine in all its possible forms of free amine, di- or mono-hydrogen phosphate salt and salt with the anion A^-; whereby there is produced an aqueous phase comprising an aqueous solution of potassium phosphate salts and an organic phase comprising said amine extractant in the form of its salt with anion A^-, dissolved in said diluent.

3,993,730

PURIFICATION OF COKE OVEN GAS WITH PRODUCTION OF SULFURIC ACID AND AMMONIUM SULFATE

Franklin D. Cooper, 1200 N. Queen St., Arlington, Va. 22209

Filed Jan. 30, 1976, Ser. No. 653,815
Int. Cl.² C01C *1/242*; C01B *17/76*; C23G *1/08*; C01C *3/04*
U.S. Cl. 423—225 **11 Claims**



1. A continuous process removing impurities from coke oven gas, said process comprising:

a. cooling the coke oven gas to a temperature in the approximate range of 78° C to 80° C and producing product NH_3 from the condensate;

b. passing the cooled gas to a slurry reactor, together with waste gases produced during the production of said NH_3;

c. using said reactor to scrub said coke oven gas using a slurry reagent comprising $Fe(OH)_2$ for reaction with the HN_3, H_2S, HCN, and $(CN)_2$ impurities contained in said gas;

d. treating the scrubbed coke oven gas to remove residual impurities;

e. separating the spent slurry reagent into product $(NH_4)_2SO_4$ solution and iron precipitates;

f. oxidizing said iron precipitates to produce product iron oxides and product gases;

g. feeding said product gases to a dual-contact acid plant to produce H_2SO_4 and waste gas;

h. feeding said waste gas to said reactor;

i. treating an Fe-containing substance with said H_2SO_4 to produce $FeSO_4$; and

j. feeding said $FeSO_4$, together with said product NH_3 and externally available NH_3, to said reactor whereby the $FeSO_4$ and NH_3 react to form said slurry reagent.

3,993,731

SELECTIVE REMOVAL OF NITROGEN OXIDES FROM WASTE GAS

Kiyoshi Morikawa, Fujisawa; Fusao Nishida, Tokyo; Tomiaki Yamada, Yokohama; Noriyuki Suzuki, Tokyo; Takehiko Takeda, Yokohama; Tsutomu Yanagihara, Tokyo; Katshiko Adachi, Yokohama; Tadashi Asanabe, Tokyo; Katuaki Ohsato, Yokohama, and Kintaro Tsuda, Tokyo, all of Japan, assignors to Japan Gasoline Co., Ltd., Tokyo, Japan

Filed June 9, 1975, Ser. No. 584,913
Claims priority, application Japan, June 10, 1974, 49-65066
Int. Cl.² B01D *53/34*
U.S. Cl. 423—239 **11 Claims**

1. A process for the removal of nitrogen oxides from a waste gas containing said nitrogen oxides in conjunction with sulfur oxides, which process is characterized by contacting said waste gas with ammonia as the reducing agent at a temperature from 250° to 550° C in the presence of a catalyst having supported on silica an active component containing iron or copper as the active metal and an aluminum sulfate, for thereby causing selective catalytic reduction of said nitrogen oxides the specific surface area of the carrier being not less than 50 m^2/g and the pore volume being from 0.2 to 1.5 cc/g.

3,993,732

METHOD OF RECYCLING LITHIUM BORATE TO LITHIUM BOROHYDRIDE THROUGH DIBORANE

Evan E. Filby, Rigby, Idaho, assignor to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed July 16, 1975, Ser. No. 596,549
Int. Cl.² C01B *1/03, 6/21*
U.S. Cl. 423—286 **10 Claims**

1. A process for recovery of lithium borohydride from lithium borate formed as a by-product in the generation of hydrogen by reaction of lithium borohydride with water which comprises:
   a. reacting said lithium borate with hydrogen chloride and water to form boric acid and lithium chloride
   b. converting said boric acid to boron trichloride
   c. converting said boron trichloride to diborane
   d. converting the lithium chloride of step a) to a lithium species selected from the group of ethyl lithium, lithium ethoxide, and lithium hydride
   e. reacting said lithium species with said diborane to form lithium borohydride.

3,993,733

FOOD GRADE ALKALI METAL PHOSPHATES FROM WET PROCESS H_3PO_4

Mazin R. Irani, Tarrytown, N.Y., assignor to Stauffer Chemical Company, Westport, Conn.

Filed Aug. 14, 1975, Ser. No. 604,520
Int. Cl.² C01B *15/16, 25/26*
U.S. Cl. 423—313 **21 Claims**

1. A process for the preparation of high purity alkali phosphate solutions from wet process phosphoric acid which comprises:
   a. contacting a wet process phosphoric acid with an organic solvent capable of extracting said acid to form a solvent-acid phase, and a raffinate phase;
   b. partially neutralizing the solvent-acid phase by contacting with a concentrated alkali in amounts sufficient to precipitate impurities, and separating said impurities;
   c. diluting said partially neutralized solvent-acid phase with water to strip a dilute aqueous phosphoric acid phase from said solvent phase, and separating said phosphoric acid phase;
   d. neutralizing the aqueous phosphoric acid to a pH of between about 5 and about 9, thereby forming a solution of soluble salts of phosphoric acid and a precipitate, and separating said precipitate;
   e. contacting said solution of soluble salts with activated carbon;
   f. contacting said solution of soluble salts with an insoluble alkaline earth metal phosphate salt and separating said insoluble salt to thereby produce a high purity alkali phosphate solution.

3,993,734

PROCESS FOR THE MANUFACTURE OF ALKALI METAL POLYPHOSPHATES

Jean-Michel Verdier, Paris; Jacques Becuwe, Fontenay-sur-Bois, and Jacques Chastel, Rouen, all of France, assignors to Rhone-Progil, Courbevoie, France

Continuation of Ser. No. 383,616, July 30, 1973, abandoned. This application June 30, 1975, Ser. No. 591,889
Int. Cl.² C01B *15/16, 25/26*
U.S. Cl. 423—315 **12 Claims**

1. A process for the manufacture of sodium tripolyphosphate having a predetermined crystalline form between 100% phase I and 100% phase II and predetermined mixtures of phase I and phase II comprising the steps of
   1. granulating a mixture of sodium orthophosphates having a molar ratio of sodium oxide to phosphoric anhydride between 1 and 2,
   2. drying the granules obtained at a temperature below 120° C, and
   3. subjecting the resulting dried granules to thermal treatment in the presence of water vapor including the steps of introducing the granules to a fluid bed containing between 14 and 100% water vapor maintained at a temperature within the range of 300° to 480° C, the temperature being such that the orthophosphate granules are completely converted to tripolyphosphates in less than 30 minutes.

3,993,735

CLEANUP OF WET PROCESS PHOSPHORIC ACID

Mazin R. Irani, Tarrytown, N.Y., assignor to Stauffer Chemical Company, Westport, Conn.

Filed Aug. 14, 1975, Ser. No. 604,518
Int. Cl.² C01B *25/16*
U.S. Cl. 423—321 R **10 Claims**

1. A method for the purification of crude or wet process phosphoric acid which comprises:
   a. Diluting the wet process phosphoric acid with water to a concentration varying from about 5 to about 30% P_2O_5;
   b. Contacting the dilute acid with activated carbon in amounts sufficient to remove high molecular weight organic impurities;
   c. Neutralizing the acid to a pH varying from about 5 to about 9 by contacting said acid with an alkali selected from the group consisting of sodium hydroxide, sodium carbonate, sodium bicarbonate and mixtures thereof; potassium hydroxide, potassium carbonate, potassium bicarbonate, and mixtures thereof; and ammonia, ammonium hydroxide, ammonium bicarbonate, ammonium carbonate and mixtures thereof;
   d. Contacting the phosphate solution thereby formed, with activated carbon in amounts sufficient to remove high molecular weight organic impurities.

3,993,736

FOOD GRADE PHOSPHORIC ACID FROM WET PROCESS ACID

Mazin R. Irani, Tarrytown, N.Y., assignor to Stauffer Chemical Company, Westport, Conn.

Filed Aug. 14, 1975, Ser. No. 604,519
Int. Cl.² C01B *25/16*
U.S. Cl. 423—321 S **26 Claims**

1. A process for the preparation of high purity phosphoric acid from wet process phosphoric acid which comprises:
   a. contacting a wet process phosphoric acid with an organic solvent capable of extracting said acid to form a solvent-acid phase and a raffinate phase;
   b. partially neutralizing the solvent-acid phase by contacting with a concentrated alkali in amounts sufficient to precipitate impurities, and separating said impurities;
   c. diluting said partially neutralized solvent-acid phase with water to strip a dilute aqueous phosphoric acid phase from said solvent phase, and separating said phosphoric acid phase;
   d. neutralizing the aqueous phosphoric acid to a pH of between about 5 and about 9, thereby forming a solution of soluble salts of phosphoric acid, and a precipitate, and separating said precipitate;
   e. contacting said solution of soluble salts with activated carbon;
   f. contacting said solution of soluble salts with an insoluble alkaline earth metal phosphate salt and separating said insoluble salt;
   g. converting said solution of soluble salts to high purity phosphoric acid.

3,993,737

PROCESS FOR THE PRODUCTION OF SILICOFORMIC ACID

David H. Blount, 5450 Lea St., San Diego, Calif. 92105

Continuation-in-part of Ser. No. 262,485, June 14, 1972, abandoned, which is a continuation-in-part of Ser. No. 71,628, Sept. 11, 1970, abandoned. This application Sept. 12, 1975, Ser. No. 612,843

Int. Cl.² C01B *33/00*

U.S. Cl. 423—325 5 Claims

1. The process for the production of silicoformic hydrogen salt and silicoformic acid which comprises the steps of:

a. providing a dry granular alkali metal metasilicate with less than 6 mols of water per mol of the alkali metasilicate;

b. adding said alkali metal metasilicate gradually to concentrated mineral acid in the ratio of 1 to 3 mols;

c. mixing and maintaining said mixture at a temperature below 100° C until the chemical reaction is completed in about 2 to 6 hours, thereby

d. producing a white granular mixture of silicoformic hydrogen salt, dihydroxyl silicon hydrogen salt, alkali metal hydrogen salt and water;

e. washing said white granular mixture with water, and the water reacts with the silicoformic hydrogen salt and dihydroxyl silicon hydrogen salt, thereby

f. producing silicoformic acid and dilute mineral acid;

g. filtering off alkali metal hydrogen salt and dilute mineral acid, thereby

h. recovering a white granular compound, silicoformic acid.

3,993,738

HIGH STRENGTH GRAPHITE AND METHOD FOR PREPARING SAME

Lyle G. Overholser, Oak Ridge; David R. Masters, Knoxville, and John M. Napier, Oak Ridge, all of Tenn., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Nov. 8, 1973, Ser. No. 414,028

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 17, 1976

Int. Cl.² C01B *31/04*

U.S. Cl. 423—448 7 Claims

5. A precursor composition for the manufacture of graphite products in which mixtures of particulate carbonizable filler materials and carbonizable organic binders are formed into the desired article configuration and heated in an inert atmosphere to graphitization temperatures, said graphite precursor composition comprising a particulate filler of a thermoplastic material coked at a temperature in the range of 400° to 1000°C. and of a particle size less than 100 mesh, a thermoplastic binder in a size range of less than 70 mesh and in a concentration of about 18 to 25 weight per cent of the mixture, and green organic carbonizable fibers in a maximum concentration of not more than 2 weight per cent of the particulate filler.

3,993,739

PROCESS FOR PRODUCING CARBON BLACK PELLETS

John W. Vanderveen, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Filed Jan. 23, 1975, Ser. No. 543,499

Int. Cl.² C09C *1/48*

U.S. Cl. 423—460 5 Claims

1. A process for the production of dried carbon black pellets which comprises

a. admixing carbon black and an aqueous pelleting solution such as to form wet carbon black pellets,

b. subjecting said wet carbon black pellets to thermal drying to remove a major portion of the water therefrom such as to produce partially dried carbon black pellets still containing a minor portion of water,

c. subjecting said partially dried pellets to a microwave irradiation such as to remove the minor portion of water and to produce dried carbon black pellets.

3,993,740

PROCESS FOR THE PRODUCTION OF FIBROUS POTASSIUM TITANATE

Hajime Saito, Aichi, and Iwao Yamai, Nagoya, both of Japan, assignors to Central Glass Co., Ltd., Japan

Filed June 27, 1975, Ser. No. 590,943

Claims priority, application Japan, July 5, 1974, 49-76422

Int. Cl.² C01G *23/00*

U.S. Cl. 423—598 6 Claims

1. A process for the production of fibrous potassium titanate which comprises reacting a tetravalent titanium compound selected from the group consisting of titanium dioxide hydrates, titanium dioxide, titanium tetrahydroxide, titanium tetrachloride, titanium tetranitrate, titanium disulfate and mixtures thereof with a basis compound selected from the group consisting of potassium hydroxide, potassium carbonate, potassium chloride, potassium nitrate and mixtures thereof in an aqueous solution at a temperature of from 250° to 450° C and a pressure of from 20 to 400 atmospheres in the presence of at least one member selected from the group consisting of compounds of titanium having less than four valencies, metallic titanium and mixtures thereof and, during said reaction, mechanically or chemically removing water from the reaction system so that the content thereof is about 5 to 15% by weight wherein the molar ratio of the titanium in the titanium compounds : the potassium in the potassium compounds : the hydroxyl group or carbonate group in the basic compound : and water is in the range of 1:0.5 to 10:0 to 10:5 to 100, and wherein the molar ratio of the lower valency titanium compound or metallic titanium to the tetravalent titanium compound is a positive quantity between 0 and 1.0.

3,993,741

^{75}SE AND ^{123m}TE COMPOUNDS FOR FAT RESORPTION TESTS

Petrus Philippus Hermann Leonardus Otto, Bleijenburg, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Nov. 1, 1974, Ser. No. 520,033

Claims priority, application Netherlands, Nov. 8, 1973, 7315287

Int. Cl.² A61K *29/00, 43/00*; G01T *1/161*; G21H *5/02*

U.S. Cl. 424—1 15 Claims

1. A compound of the formula

where X is an oxygen atom, ^{75}Se-atom or ^{123m}Te-atom, with the proviso that at least one of the substituents X represents a ^{75}Se-atom or ^{123m}Te-atom, and R is a straight or branched alkyl group or aralkyl group having from 2 to 20 carbon atoms, all the substituents designated by R together containing at least 20 carbon atoms.

3,993,742

METHOD FOR THE DETECTION OF FATTY SUBSTANCES ON SURFACES

Hans-Georg Rey; Walter Rittersdorf, both of Mannheim-Woldhof, and Ernst-Werner Busch, Lampertheim, all of Germany, assignors to Boehringer Mannheim G.m.b.H., Mannheim, Germany

Division of Ser. No. 219,566, Jan. 20, 1972, abandoned. This application Dec. 19, 1973, Ser. No. 426,424

Claims priority, application Germany, Feb. 11, 1971, 2106408

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 3, 1976

Int. Cl.[2] A61K *29/00*; G01N *13/00*, *21/04*

U.S. Cl. 424—9 9 Claims

1. Method for detecting fat or fat-like substances on a surface, which consists essentially of contacting the surface with the plastic material coated surface of a diagnostic means, thereby immediately producing a clear image of the distribution of the fat or fat-like substances on said surface, said means comprising a film, foil, or paper having a dark base color and a face coating in a thickness sufficient to mask the color of the base, said face coating comprising a finely dispersed plastic material having microporous interstices and having a white bloom, said plastic material being selected from the group consisting of cellulose butyrate, cellulose oleate, cellulose stearate, cellulose phthalate, cellulose naphthenate, cellulose laurate, cellulose acetobutyrate, cellulose acetomaleate, cellulose acetonitrate, ethyl cellulose, acetyl cellulose, benzyl cellulose, nitrocellulose, ethyl cellulose nitrate, benzyl cellulose acetate, ethyl cellulose acetate, glycol cellulose acetate, polymethacrylate and polystyrene.

3,993,743

METHOD FOR DIAGNOSIS OF CHAGAS' DISEASE

William L. Hanson, Bishop, Ga., assignor to Research Corporation, New York, N.Y.

Division of Ser. No. 386,285, Aug. 7, 1973, Pat. No. 3,911,097. This application Feb. 7, 1975, Ser. No. 547,956

Int. Cl.[2] G01N *31/02*, *33/16*; A61K *39/00*

U.S. Cl. 424—12 5 Claims

1. A process for diagnosing Chagas' disease in a living mammal susceptible to infection by *Trypanosoma cruzi* which comprises:

a. reacting in vitro an antibody-containing blood sample from said mammal in an immunoprecipitin test with an immunologically effective amount of a purified water-soluble antigen preparation capable of forming a precipitated antigen-antibody complex in an immunoprecipitin reaction when contacted with antibodies associated with chronic Chagas' disease, said antigen preparation comprising an immunoprecipitatingly effective concentration and amount of water-soluble cellular antigens released by disruption of cells from essentially only the trypomastigote and amastigote growth stages of the protozoa *Trypanosoma cruzi* and being substantially free from serum protein antibodies, from antigens associated with the epimastigote growth stage of said protozoa and from water-insoluble cellular material; and

b. diagnosing the presence of Chagas' disease from the formation of precipitin bands at an antigen-antibody interface.

3,993,744

LIVE HUMAN HAIR TREATMENT COMPOSITIONS CONTAINING PERFLUORINATED COMPOUNDS

John A. Cella, Plandome Mills, N.Y., and August Emil Fiebig, Jr., Chicago, Ill., assignors to Alberto Culver Company, Melrose Park, Ill.

Filed May 31, 1974, Ser. No. 474,954

Int. Cl.[2] A61K *7/06*

U.S. Cl. 424—70 20 Claims

1. A composition for treating live human hair comprising water, an organic solvent or mixtures thereof which includes, as an ingredient thereof, a hydrophobic-lipophobic compound of anionic, cationic, nonionic or amphoteric character corresponding to the formula

$$CF_3—(CF_2)_x—(CH_2)_y—Z$$

where Z is a member selected from the group consisting of a water-solubilizing groups and an oil-solubilizing group, x is an integer from 2 to 17, and y is an integer from 0 to 4, said compound being present in proportions, based on the weight of the composition, in the range of about 0.05% to not in substantial excess of the solubility or ready dispersibility of said compound in the composition and not in excess of 10%, said composition also containing, as an additional ingredient, a combing aid selected from the group consisting of cationic compounds, silicones and proteins.

3,993,745

PERFLUORINATED COMPOUNDS IN HAIR TREATMENT COMPOSITIONS

John A. Cella, Plandome Mills, N.Y.; Robert A. Lukey, Northbrook, Ill.; August Emil Fiebig, Jr., Chicago, Ill., and Frank J. Pum, Glen Ellyn, Ill., assignors to Alberto Culver Company, Melrose Park, Ill.

Filed May 31, 1974, Ser. No. 474,956

Int. Cl.[2] A01K *4/11*

U.S. Cl. 424—71 12 Claims

1. A composition, for treating live human hair selected from the class consisting of a hair setting lotion, a hair setting gel and a hair spray, which includes, as ingredients thereof, a resin, a solvent, and a hydrophobic-lipophobic compound of anionic, cationic, nonionic or amphoteric character corresponding to the formula

$$CF_3—(CF_2)_x—(CH_2)_y—Z$$

where Z is a member selected from the class consisting of a water-solubilizing group and an oil-solubilizing group, x is an integer from 2 to 17, and y is an integer from 0 to 4, said compound being present in proportions, based on the weight of the composition, in the range of about 0.05% to not in substantial excess of the solubility or ready dispersibility of said compound in the composition and not in excess of 10%.

12. A hair setting lotion comprising a solvent, from about 1% to 7% of a hair treating resin and the hydrophobic-lipophobic compound of anionic, cationic, nonionic or amphoteric character corresponding to the formula set forth in claim 1, said compound being present in proportions, based on the weight of the lotion, in the range of about 0.05% to about 2%.

3,993,746

COMPOSITIONS FOR CULTURING AND/OR CAPTURING FISH AND CRUSTACEA

Myron A. Beigler, Palo Alto, and Ronald J. Amen, Sunnyvale, both of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Division of Ser. No. 372,342, June 21, 1973, Pat. No. 3,903,260. This application Apr. 10, 1975, Ser. No. 567,037

Int. Cl.[2] A61K *31/195*, *31/74*

U.S. Cl. 424—78 12 Claims

1. An aqua life feed comprising at least one protein source, a non-toxic binder which is slightly soluble in water, and an

effective amount of an exploratory feeding behavior inducing agent which is a mixture of monosodium glutamate with an alkali metal aspartate wherein said feed contains less than 10% by weight of said exploratory feeding behavior inducing agent.

3,993,747

METHOD FOR LOCAL IMMUNIZATION AGAINST DENTAL CARIES

Abdul Gaffar, Somerset, and Hans Wilhelm Marcussen, Jr., Piscataway, both of N.J., assignors to Colgate-Palmolive Company, New York, N.Y.

Division of Ser. No. 371,842, June 20, 1973, Pat. No. 3,931,398. This application Sept. 18, 1975, Ser. No. 614,384

Int. Cl.² A61K *37/48*

U.S. Cl. 424—88 **8 Claims**

1. A method for immunization against dental caries, which comprises locally administering a vaccine constituting an aqueous saline dispersion of an active ingredient selected from the group consisting of a levansucrase or dextransucrase enzyme, in the vicinity of the oral mucosa of an animal susceptible to dental caries, said active ingredient being administered by injection in an amount effective for immunization.

3,993,748

ANTIBIOTIC U-47,929 AND ITS PREPARATION

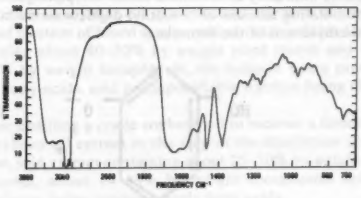
Alexander D. Argoudelis; Fritz Reusser, and Howard A. Whaley, all of Portage, Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Filed Jan. 20, 1975, Ser. No. 542,226

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 24, 1976

Int. Cl.² A61K *35/70*

U.S. Cl. 424—118 **8 Claims**



1. Antibiotic U-47,929, which is active against *S. aureus* and which in its essentially pure form:

a. has the molecular formula $C_{13}H_{24}N_6O_3$;

b. has the following elemental analysis: C, 50.00; H, 7.69; N, 26.92; O, 15.38;

c. has a specific rotation of $[\alpha]_D^{25} = +39°$ (c, 1, water);

d. is soluble in water and lower alcohols, for example, methanol and ethanol; is relatively insoluble in ketones, halogenated or saturated hydrocarbon solvents, ethyl acetate, or other ester-type solvents;

e. has a characteristic infrared adsorption spectrum when dissolved in a mineral oil mull as shown in FIG. 1 of the drawings;

f. has a characteristic NMR spectrum as shown in FIG. 2 of the drawings, or acid addition salts thereof.

2. A process for preparing antibiotic U-47,929, which comprises cultivating *Streptomyces ficellus* Dietz, sp. n., having the identifying characteristics of NRRL 8067, and mutants thereof, in an aqueous nutrient medium under aerobic conditions until substantial antibiotic activity is imparted to said medium.

3,993,749

RAPAMYCIN AND PROCESS OF PREPARATION

Surendra N. Sehgal, Dollard des Ormeaux; Teodora M. Blazekovic, Mount Royal, and Claude Vezina, Deux-Montagnes, all of Canada, assignors to Ayerst McKenna and Harrison Ltd., Montreal, Canada

Division of Ser. No. 460,665, April 12, 1974, Pat. No. 3,929,992, which is a continuation-in-part of Ser. No. 293,699, Sept. 29, 1972, abandoned. This application Sept. 25, 1975, Ser. No. 616,695

Int. Cl.² A61K *35/74*

U.S. Cl. 424—122 **2 Claims**

2. A method of inhibiting the growth of pathogenic fungi in a mammal which comprises administering to said mammal an antifungally effective amount of the antibiotic rapamycin which

a. is a colourless, crystalline compound with a melting point of 183° to 185° C, after recrystallization from ether;

b. is soluble in ether, chloroform, acetone, methanol and dimethylformamide, very sparingly soluble in hexane and petroleum ether and substantially insoluble in water;

c. shows a uniform spot on thin layer plates of silica gel;

d. has a characteristic elemental analysis of about C, 66.84%; H, 8.84%; N, 1.37%;

e. exhibits the following characteristic absorption maxima in its ultraviolet absorption spectrum (95% ethanol); 267 nm ($E_{1cm}^{1\%}$ 417), 277 nm ($E_{1cm}^{1\%}$ 541) and 288 nm ($E_{1cm}^{1\%}$ 416);

f. has a characteristic infrared absorption spectrum shown in accompanying FIG. 1;

g. has a characteristic nuclear magnetic resonance spectrum as shown in accompanying FIG. 2;

h. has a minimum inhibitory concentration of 0.02 to 0.1 μg/ml against *Candida albicans;* and

i. exhibits a LD_{50} (i.p., mice) of 597.3 ± 28.1 mg/kg and a LD_{50} (p.o., mice) of >2,500 mg/kg.

3,993,750

AQUEOUS HYPERTONIC SOLUTION AND COMPOSITIONS USEFUL FOR PREPARATION OF SAME

Charles L. Fox, Jr., New York, N.Y., assignor to Research Corporation, New York, N.Y.

Filed Dec. 20, 1974, Ser. No. 534,883

Int. Cl.² A61K *31/70, 33/06, 33/10, 33/14*

U.S. Cl. 424—128 **14 Claims**

1. An aqueous hypertonic solution suitable for administration to humans for the treatment of trauma comprising on the basis of 1 liter of solution about 200–300 mEq sodium, about 145–215 mEq chloride, about 55–85 mEq bicarbonate or acetate or lactate, the sodium to chloride ratio being about 1.4.

3,993,751

PROCESS FOR STABILIZING THERAPEUTIC COMPOSITIONS AND ARTICLE

Charles D. Zinke, Fort Worth, Tex., assignor to Cybersol, Inc., Dallas, Tex.

Division of Ser. No. 308,021, Nov. 27, 1972, Pat. No. 3,878,664. This application Mar. 7, 1975, Ser. No. 556,281

Int. Cl.² A61K *33/10, 33/14, 33/42*

U.S. Cl. 424—128 **15 Claims**

1. An article comprising a container having a liquid phase and gaseous phase hermetically sealed therewithin, said liquid phase comprising an injectable aqueous solution comprising about 75 to about 150 millimoles of sodium cation, about 5 to about 50 millimoles of potassium cation, about 5 to about 50 millimoles of bicarbonate ion, and about 75 to about 150 millimoles of chloride ion and having an osmolality in the range of from about 170 to about 460, and a pH in the range of from about 6 to about 8.5, said gaseous phase being in contact with said liquid phase and comprising a mixture of carbon dioxide and inert gas, said carbon dioxide being present in an amount to impart substantially equal pressure to the

partial pressure of carbon dioxide from said liquid due to equilibrium within said liquid at a temperature in the range of about 25° to about 50° C.

3,993,752

WOOD PRESERVATIVE CONTAINING ALKALI METAL CYANIDES

Robert E. Stutz, Los Altos Hills, Calif., assignor to Koppers Company, Inc., Pittsburgh, Pa.

Continuation-in-part of Ser. No. 631,595, April 18, 1967, abandoned. This application Aug. 7, 1969, Ser. No. 848,336

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 30, 1976

Int. Cl.² A01N *11/00*

U.S. Cl. 424—129 **8 Claims**

1. A wood preservative composition comprising (1) from about 0.001% to 40% by weight of an alkali metal cyanide selected from the group consisting of lithium cyanide, sodium cyanide and potassium cyanide; (2) from about 20% to about 90% by weight of water; (3) from about 0.05% to about 18% by weight of an alkali metal hydroxide selected from the group consisting of lithium hydroxide, sodium hydroxide and potassium hydroxide; (4) from about 1% to about 22% by weight of an alkali metal borate selected from the group consisting of lithium borate, sodium borate and potassium borate; (5) from about 3% to about 15% by weight of an alkanol having from 1 to 4 carbons; (6) from about 3% to about 20% by weight of an organic solvent selected from the group consisting of acetone, methylethyl ketone, ethylene glycol, propylene glycol, glycerol, di-propylene glycol, tri-propylene glycol, ethylene glycol methyl ether, di-ethylene glycol methyl ether, propylene glycol methyl ether and di-propylene glycol methyl ether; (7) from about 5% to about 40% by weight of a halogenated phenol and (8) from about 0.005% to about 5% by weight of a heavy metal salt or oxide selected from the group consisting of inorganic and organic salts of mercury, lead, tin, copper, zinc, cadmium, arsenic, antimony and silver, and oxides of mercury, lead, tin, copper, zinc, cadmium, arsenic, antimony and silver.

3,993,753

ANHYDROUS AMPICILLIN STABILIZATION AND RESULTANT COMPOSITIONS

Surendra M. Bahal, Audubon, Pa., assignor to American Home Products Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 500,242, Aug. 26, 1974, abandoned, which is a continuation-in-part of Ser. No. 44,548, June 8, 1970, Pat. No. 3,867,523. This application Aug. 21, 1975, Ser. No. 606,386

Int. Cl.² A61K *31/00*, *47/00*

U.S. Cl. 424—176 **4 Claims**

1. A stabilized aqueous pharmaceutical suspension comprising:

A. 1.25 to 10 percent by weight per volume of anhydrous ampicillin;

B. A member selected from the class consisting of a minimum range of 10–50% w/v dextrose, a minimum range of 10–35% w/v galactose, and a minimum range of 5–25% w/v sodium chloride; and

C. A buffer adjusting the pH to a range between about 5 to 6.5, wherein said lowest minimum range of solutes is used at pH 6.5 at 25° C and said highest minimum range of solute is used at pH 5 at about 5° C with the proviso that galactose is not effective below pH 6.0 at 5° C.

3,993,754

LIPOSOME-ENCAPSULATED ACTINOMYCIN FOR CANCER CHEMOTHERAPY

Yueh-Erh Rahman, and Elizabeth A. Cerny, both of Downers Grove, Ill., assignors to The United States of America as represented by the United States Energy Research and Development Administration, Washington, D.C.

Filed Oct. 9, 1974, Ser. No. 513,210

Int. Cl.² A61K *37/02*

U.S. Cl. 424—177 **4 Claims**

1. A method of reducing the toxicity of actinomycin D when employed as an antineoplastic agent in an animal or man which comprises administering to said animal or man an effective antineoplastic amount of liposome encapsulated actinomycin D.

3,993,755

PHARMACEUTICAL COMPOSITION CONTAINING THE N-METHYL-D-GLUCOSAMINE COMPLEX OF 4-METHYLURACIL AND USE THEREOF

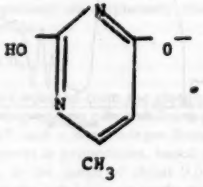
Valter Osvaldovich Kulbakh, Bukharestskaya ulitsa, 86, korpus 1, kv. 85, and Inesa Vladimirovna Popova, Vasilievsky ostrov, 2 liniya, 25, kv. 27, both of Leningrad, U.S.S.R.

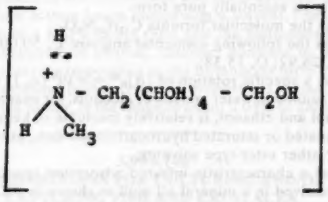
Division of Ser. No. 349,670, April 9, 1973, Pat. No. 3,912,714. This application Aug. 8, 1975, Ser. No. 603,112

Int. Cl.² A61K *31/70*

U.S. Cl. 424—180 **7 Claims**

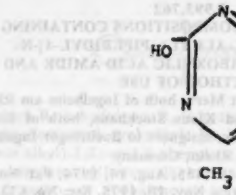
1. A pharmaceutical composition capable of stimulating unspecific immunity of ulcerated tissue comprising an immunity stimulating amount of N-methyl-d-glucosamine complex of 4-methyluracil of the formula:

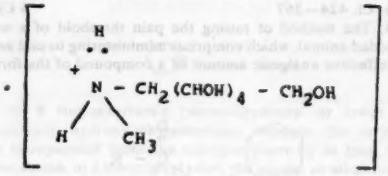




as the active principle.

4. A method for stimulating unspecific immunity and reparative regeneration of ulcerated tissue consisting essentially of administering to said tissue either orally or by intramuscular injection or by intracavitary introduction a parhmaceutical composition comprising an immunity stimulating or tissue regenerating effective amount of the N-methyl-d-glucosamine complex of 4-methyluracil of the formula:





3,993,756

ANTILIPEMIC AGENT CONTAINING A SOYBEAN OIL FRACTION

Takashi Kaneda, No. 14-1-44, Sanjo, Sendai, Miyagi, Japan, and Toshikazu Tabata, No. 748, Kikuna, Kohoku, Yokohama, Japan

Continuation-in-part of Ser. No. 358,537, May 9, 1973, abandoned. This application Feb. 11, 1975, Ser. No. 549,047

Int. Cl.² A61K *35/78*

U.S. Cl. 424—195 **7 Claims**

1. An antilipemic composition comprising a nonsaponifiable fraction of soybean oil in an amount effective to suppress the lipid content of blood serum, said nonsaponifiable fraction containing about 40–50% by weight plant sterols and about 18–22% by weight tocopherols, the balance being predominantly fatty acids, said nonsaponifiable fraction being obtainable by:

steam distilling a crude soybean oil to recover a deodorized soybean oil extract in the trap of the distillation apparatus, said extract containing about 25–30% by weight plant sterols, about 14–18% by weight tocopherols and the balance being predominantly fatty acids;

reacting methanol with said deodorized soybean oil extract to convert said fatty acids to the corresponding methyl esters, thus obtaining a mixture containing said methyl esters; and

removing the fatty acid esters by molecular distillation at 170°–190° C and 20–130μ Hg to produce said nonsaponifiable fraction as the still residue.

3,993,757

METHOD OF TREATING INFLAMMATION WITH MORPHANTHRIDINES

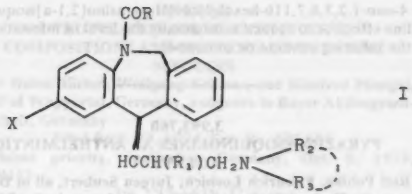
Jules Freedman, Thiensville, Wis., assignor to Richardson-Merrell Inc., Wilton, Conn.

Filed June 6, 1975, Ser. No. 584,587

Int. Cl.² A61K *31/33, 31/40, 31/495, 31/5535*

U.S. Cl. 424—244 **3 Claims**

1. A method of treating inflammation in animals which comprises the step of administering to an animal suffering from inflammation a safe and an anti-inflammatory effective amount of a trans isomer of a compound of the formula:



in which X is hydrogen, a halogen, trifluromethyl, a lower alkyl of 1 to 4 carbon atoms, or a lower alkoxy of 1 to 4 carbon atoms, R is hydrogen or an alkyl of 1 to 8 carbon atoms, R_1 is hydrogen or methyl, and R_2 and R_3 are selected from hydrogen, a lower alkyl of 1 to 4 carbon atoms, or a phenyl-lower alkyl of 7 to 13 carbon atoms, R_2 and R_3 may be joined together to form a heterocyclic amino group selected from the group consisting of morpholino, pyrrolidino, piperadino, N-lower alkyl piperazino, N-phenyl-lower alkyl piperazino or N-(hydroxy-lower alkyl)-piperazino; or a pharmaceutically acceptable salt thereof.

3,993,758

CEPHALOSPORIN COMPOUNDS

George Burton, Coulsdon, and Elzbieta Watson, Carshalton, both of England, assignors to Beecham Group Limited, United Kingdom

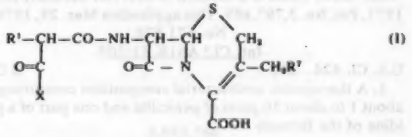
Filed Jan. 15, 1975, Ser. No. 541,333

Claims priority, application United Kingdom, Jan. 18, 1974, 2437/74; Apr. 10, 1974, 16059/74

Int. Cl.² A61K *27/00;* **C07D** *501/14*

U.S. Cl. 424—246 **10 Claims**

1. A compound of formula (I):



wherein R^1 phenyl, cyclohexa-1,4-dienyl, 4-hydroxyphenyl, 3,4-dihydroxyphenyl, 3-chloro-4-hydroxyphenyl or 2- or 3-thienyl; R^7 is carbamoyloxy 2-methyl-1,3,4-thiadiazol-5-yl thio, 1-methyl-1H-tetrazol-5-yl thio, 1H-1,2,4-triazol-3-yl thio or an alkylthio radical having from 1 to 3 carbon atoms; X is phenoxy, methoxy, or benzyloxy; or a pharmaceutically acceptable slt or a pivaloyloxymethyl, α-pivaloyloxyethyl, phthalidyl or 5,6-dimethoxyphthalidyl ester thereof.

9. An antibacterial pharmaceutical composition which comprises an effective amount of a compound of claim 1, together with a pharmaceutically acceptable carrier.

3,993,759

ANTHELMINTIC

Rolf Pohlke; Friedrich Loebich, both of Darmstadt; Herbert Thomas, Wuppertal-Elberfeld, and Jurgen Thyssen, Wuppertal-Cronenberg, all of Germany, assignors to Merck Patent Gesellschaft mit beschrankter Haftung, Darmstadt, Germany

Filed Mar. 11, 1974, Ser. No. 449,690

Claims priority, application Germany, Mar. 12, 1973, 2312134

Int. Cl.² A61K *31/495*

U.S. Cl. 424—250 **20 Claims**

1. A method of treating cestodial and trematodial infestations in animals which comprises administering to an animal infested with cestodes or trematodes an amount of 2-benzoyl-

4-oxo-1,2,3,6,7,11b-hexahydro-4H-pyrazino[2,1-a]isoquinoline effective to reduce substantially the level of infestation of the infesting cestode or trematode.

3,993,760

PYRAZINOISOQUINOLINES AS ANTHELMINTIC AGENTS

Rolf Pohlke; Friedrich Loebich; Jurgen Seubert, all of Darmstadt; Herbert Thomas, and Peter Andrews, both of Wuppertal-Elberfeld, all of Germany, assignors to Merck Patent Gesellschaft mit beschrankter Haftung, Darmstadt, Germany

Filed June 21, 1974, Ser. No. 481,792

Claims priority, application Germany, June 22, 1973, 2331713

The portion of the term of this patent subsequent to Nov. 23, 1993, has been disclaimed.

Int. Cl.² A61K *31/495*

U.S. Cl. 424—250 **10 Claims**

1. A method of treating cestodial and trematodial infestations in animals which comprises administering to an animal infested with cestodes or trematodes an anthelmintically effective amount of (−) 2-benzoyl-4-oxo-1,2,3,6,7,11b-hexahydro-4H-pyrazino(2,1-a)-isoquinoline, substantially free from its (+) isomer.

3,993,761

ANTIBACTERIAL COMPOSITIONS

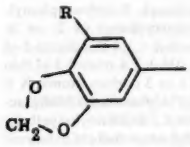
Emanuel Grunberg, North Caldwell, and Max Hoffer, Nutley, both of N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

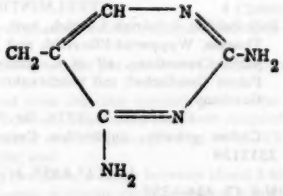
Division of Ser. No. 531,135, Dec. 9, 1974, Pat. No. 3,962,435, which is a division of Ser. No. 404,953, Oct. 10, 1973, Pat. No. 3,867,527, which is a division of Ser. No. 203,869, Dec. 1, 1971, Pat. No. 3,787,409. This application Mar. 29, 1976, Ser. No. 671,878

Int. Cl.² A61K *31/505*

U.S. Cl. 424—251 **3 Claims**

1. A therapeutic antibacterial composition comprising from about 1 to about 50 parts of penicillin and one part of a pyrimidine of the formula





wherein R is lower alkoxy, or acid addition salts thereof with pharmaceutically acceptable acids.

3,993,762

PHARMACEUTICAL COMPOSITIONS CONTAINING AN N-[1-(ω-PHENYL-ALKYL) -PIPERIDYL-4]-N-(α-PYRIDYL)-CARBOXYLIC ACID AMIDE AND METHOD OF USE

Adolf Langbein; Herbert Merz, both of Ingelheim am Rhein; Gerhard Walther, and Klaus Stockhaus, both of Bingen (Rhine) all of Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany

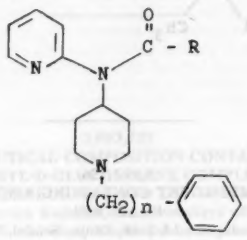
Division of Ser. No. 497,455, Aug. 14, 1974, Pat. No. 3,933,832. This application Nov. 18, 1975, Ser. No. 632,995

Claims priority, application Germany, Aug. 20, 1973, 2341965

Int. Cl.² A61K *31/445*

U.S. Cl. 424—267 **6 Claims**

4. The method of raising the pain threshold of a warm-blooded animal, which comprises administering to said animal an effective analgesic amount of a compound of the formula



wherein

R is alkyl of 1 to 3 carbon atoms, alkoxy of 1 to 2 carbon atoms or phenyl, and

n is an integer from 2 to 4, inclusive,

or a non-toxic, pharmacologically acceptable acid addition salt thereof.

3,993,763

TERTIARY AMINOACIDS AS ANTI-INFLAMMATORY AGENTS

Richard William James Carney, New Providence, and George deStevens, Summit, both of N.J., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

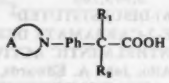
Continuation-in-part of Ser. No. 808,343, March 18, 1969, abandoned, which is a continuation-in-part of Ser. No. 790,863, Jan. 13, 1969, abandoned, which is a continuation-in-part of Ser. No. 757,136, Sept. 3, 1968, Pat. No. 3,657,230, which is a continuation-in-part of Ser. No. 716,347, March 27, 1968, abandoned. This application Nov. 17, 1972, Ser. No. 307,698

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 3, 1976

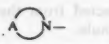
Int. Cl.² A61K *31/445*

U.S. Cl. 424—267 **3 Claims**

1. An antiinflammatory pharmaceutical composition comprising an antiinflammatory effective amount of a compound of the formula



in which R_1 is hydrogen, R_2 is hydrogen, lower alkyl, or 3 to 7 ring-membered cycloalkyl, Ph is 1,3- or 1,4-phenylene, (lower alkyl)-1,3- or 1,4-phenylene, (lower alkoxy)- 1,3- or 1,4-phenylene, [(lower alkylmercapto)-1,3- or 1,4-phenylene,] mono- or di-(halogeno)-1,3- or 1,4-phenylene, (trifluoromethyl)-1,3- or 1,4-phenylene, [(nitro)-1,3- or 1,4-phenylene, (amino)-1,3- or 1,4-phenylene] or (di-lower alkylamino)-1,3- or 1,4-phenylene, the group



is 5 to 8 ring-membered [mono-(hydroxy- or lower alkanoyloxy)] hydroxy-alkyleneimino, wherein the oxygen atom is separated from the nitrogen atom by at least two carbon atoms, or a lower alkyl ester, the amide, an alkali metal or alkaline earth metal salt or a therapeutically useful acid addition salt thereof, together with a pharmaceutical excipient.

3,993,764

TREATMENT OF DEPRESSIVE STATES AND PARKINSON'S DISEASE

Claude Dumont, Nogent-sur-Marne, and Jacques Laurent, Chilly-Mazarin, both of France, assignors to Roussel-UCLAF, Paris, France

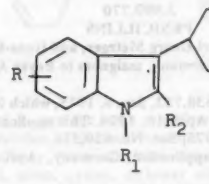
Filed Nov. 28, 1975, Ser. No. 636,098

Claims priority, application France, Dec. 9, 1974, 74.40233; Oct. 23, 1975, 75.32483

Int. Cl.² A61K *31/445*

U.S. Cl. 424—267 **8 Claims**

1. A method of treating depressive states and symptoms of Parkinson disease in humans comprising administering to humans an effective amount of at least one compound selected from the group consisting of 3-(4'-piperidyl)-indoles of the formula



wherein R is selected from the group consisting of hydrogen and alkoxy of 1 to 5 carbon atoms and R_1 and R_2 are individually selected from the group consisting of hydrogen and alkyl of 1 to 5 carbon atoms and their non-toxic, pharmaceutically acceptable acid addition salts.

3,993,765

1-PROPYL-TRIAZOLYL ANTIMYCOTIC COMPOSITIONS AND METHODS OF TREATING MYCOSES

Karl Heinz Büchel; Wolfgang Krämer, and Manfred Plempel, all of Wuppertal, Germany, assignors to Bayer Aktiengesellschaft, Germany

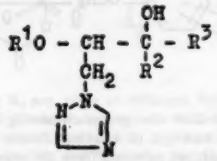
Filed Sept. 23, 1974, Ser. No. 508,684

Claims priority, application Germany, Oct. 5, 1973, 2350121

Int. Cl.² A61K *31/41*

U.S. Cl. 424—269 **43 Claims**

21. A method for treating mycoses in humans and animals which comprises administering to said human or animal an antimycotically effective amount of a compound of the formula



or a pharmaceutically acceptable non-toxic salt thereof wherein

R^1 is phenyl or naphthyl unsubstituted or substituted by 1 to 3 substituents selected from the group consisting of alkyl of 1 to 4 carbon atoms, halogen, haloalkyl of 1 or 2 carbon atoms in the alkyl moiety and 2 to 5 halo moieties, and phenyl;

R^2 is hydrogen; alkyl of 1 to 6 carbon atoms; or alkenyl of 2 to 6 carbon atoms; and

R^3 is hydrogen or alkyl of 1 to 4 carbon atoms; provided that when R^3 is hydrogen, R^2 cannot be hydrogen.

3,993,766

SUBSTITUTED 2-AMINO-Δ^2-THIAZOLINE DERIVATIVES AS ACARICIDAL AGENTS

Otto Behner, and Wilhelm Stendel, both of Wuppertal, Germany, assignors to Bayer Aktiengesellschaft, Germany

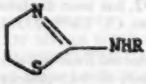
Division of Ser. No. 370,588, June 18, 1973, abandoned, which is a continuation-in-part of Ser. No. 127,405, March 23, 1971, abandoned. This application Mar. 28, 1975, Ser. No. 562,833

Claims priority, application Germany, Apr. 2, 1970, 2015675

Int. Cl.² A01N *9/12, 9/22*

U.S. Cl. 424—270 **16 Claims**

1. A method of combatting ectoparasitic acarids which comprises contacting said acarids with an acaricidally effective amount of a compound selected from the group consisting of (A) a Δ^2-thiazoline of the formula:



in which R is (i) phenyl substituted in the 2-position by chloro, bromo, trifluoromethyl, methyl or methoxy and further unsubstituted or substituted in one or both of the 4- and 6-position by methyl, methoxy, chloro or bromo, (ii) 5,6,7,8-tetrahydronaphth-1-yl, (iii) naphth-1-yl or (iv) 1,3,5-trimethylpyrazol-4-yl, and (B) addition salts of said Δ^2-thiazoline with organic or inorganic acids.

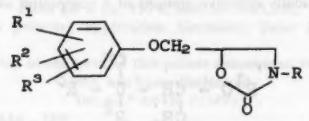
3,993,767

COMPOSITIONS TO SUPPRESS GASTRIC BLEEDING IN INDOMETHACIN AND PHENYLBUTAZONE THERAPY

Reevis Stancil Alphin, and David Andrew Droppleman, both of Richmond, Va., assignors to A. H. Robins Company, Incorporated, Richmond, Va.

Filed Nov. 18, 1975, Ser. No. 633,043
Int. Cl.² A61K *31/40, 31/42, 31/415*
U.S. Cl. 424—272 13 Claims

1. The method of treating inflammatory conditions in mammals which comprises administering an effective amount of indomethacin or phenylbutazone and a phenoxymethyl-3-oxazolidinone of the formula:



wherein;

R is selected from the group consisting of hydrogen or lower-alkyl having 1 to 4 carbon atoms,

R^1 and R^2 each are selected from the group consisting of hydrogen, chlorine, bromine, fluorine, lower-alkyl or lower-alkoxy, and

R^3 is selected from the group consisting of hydrogen, lower-alkyl, chlorine, bromine or fluorine.

3,993,768

5(6)-BENZENE RING SUBSTITUTED BENZIMIDAZOLE-2-CARBAMATE DERIVATIVES HAVING ANTHELMINTIC ACTIVITY

Colin C. Beard, Palo Alto; John A. Edwards, Los Altos, and John H. Fried, Palo Alto, all of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

Division of Ser. No. 526,861, Nov. 25, 1974, Pat. No. 3,929,824, which is a continuation-in-part of Ser. No. 417,963, Nov. 21, 1973, Pat. No. 3,929,821, which is a continuation-in-part of Ser. No. 319,299, Dec. 29, 1972, abandoned. This application Aug. 13, 1975, Ser. No. 604,502
The portion of the term of this patent subsequent to Dec. 30, 1992, has been disclaimed.
Int. Cl.² C07D *235/32*
U.S. Cl. 424—273 14 Claims

1. A compound selected from the group consisting of:

1-(n-butylcarbamoyl)-5(6)-(3-chloropropylsulfinyl)-2-carbomethoxyaminobenzimidazole;

1-(n-butylcarbamoyl)-5(6)-[2-(benzyloxy)ethoxy]-2-carbomethoxyaminobenzimidazole;

1-(n-butylcarbamoyl)-5(6)-(but-3-en-1-ylthio)-2-carbomethoxyaminobenzimidazole; and

1-(n-butylcarbamoyl)-5(6)-[2-(p-chlorophenoxy)-ethoxy]-2-carbomethoxyaminobenzimidazole;

or a pharmaceutically acceptable salt thereof.

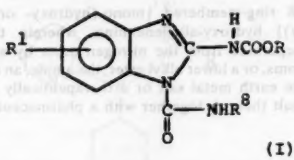
3,993,769

1,5(6)-DISUBSTITUTED BENZIMIDAZOLE-2-CARBAMATE DERIVATIVES HAVING ANTHELMINTIC ACTIVITY

Colin C. Beard, Palo Alto; John A. Edwards, Los Altos, and John H. Fried, Palo Alto, all of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

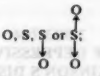
Division of Ser. No. 473,865, May 28, 1974, Pat. No. 3,929,822, which is a continuation-in-part of Ser. No. 417,963, Nov. 21, 1973, Pat. No. 3,929,821, which is a continuation-in-part of Ser. No. 319,299, Dec. 29, 1972, abandoned. This application Aug. 18, 1975, Ser. No. 605,704
The portion of the term of this patent subsequent to Dec. 30, 1992, has been disclaimed.
Int. Cl.² C07D *235/32*
U.S. Cl. 424—273 42 Claims

1. A compound selected from the group of compounds represented by the formula:



(I)

where R is lower alkyl having 1 to 4 carbon atoms; R^1 is $-SOR^5$, $-SR^5$, $-OR^5$ or $M'(CH_2)_nMR^7$; R^2 is substituted lower alkyl having from 1 to 6 carbon atoms, substituted lower alkenyl or substituted lower alkynyl having 3 to 6 carbon atoms, substituted phenyl, substituted benzyl or substituted phenethyl; R^5 is substituted lower alkenyl or substituted lower alkynyl having 3 to 6 carbon atoms, substituted benzyl or substituted phenethyl; R^7 is substituted lower alkyl having 1 to 4 carbon atoms or substituted phenyl; M and M′ are independently



n is 1–4; and R^8 is phenyl, benzyl, phenethyl, or lower alkyl having 1 to 12 carbon atoms and optionally substituted with a —COOR group where R is lower alkyl having 1 to 4 carbon atoms; said lower alkyl, lower alkenyl, or lower alkynyl group of said R^1 moiety being substituted with one or more thiocyanato, alkoxy having 1 to 6 carbon atoms, phenyl, benzoyl, hydroxy, cycloalkyl having 3 to 7 carbon atoms, halo, cyano or nitro radicals, and said phenyl, benzyl or phenethyl groups of said R^1 moiety being substituted with one or more alkyl having 1 to 6 carbon atoms, alkoxy having 1 to 6 carbon atoms, halo or nitro radicals; the R^1 substitution being at the 5(6)-position; or a pharmaceutically acceptable salt thereof.

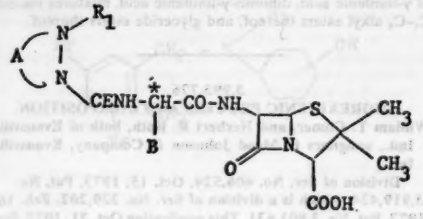
3,993,770

PENICILLINS

Wilfried Schröck; Karl-Georg Metzger, and Hans-Bodo König, all of Wuppertal, Germany, assignors to Bayer Aktiengesellschaft, Germany

Division of Ser. No. 538,753, Jan. 6, 1975, which is a division of Ser. No. 461,227, April 15, 1974. This application Nov. 6, 1975, Ser. No. 629,526
Claims priority, application Germany, Apr. 19, 1973, 2320039
Int. Cl.² C07D *499/68, 499/70*
U.S. Cl. 424—271 44 Claims

1. A pharmaceutical composition useful for treating bacterial infections in humans and animals which comprises an antibacterially effective amount of a compound of the formula:



or a pharmaceutically acceptable nontoxic salt thereof wherein

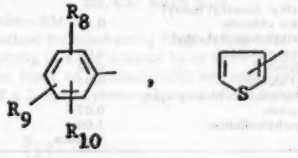
R_1 is hydrogen, straight or branched chain alkyl of 1 to 5 carbon atoms, monoaralkyl of up to 8 carbon atoms, monoaryl, or thienyl;

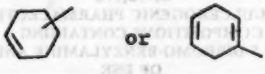
A is

wherein

R_2, R_3, R_4 and R_5 are the same or different and each is hydrogen, straight or branched chain alkyl of 1 to 5 carbon atoms, monoaralkyl of up to 8 carbon atoms, monoaryl, or thienyl;

B is





wherein

R_8, R_9 and R_{10} are the same or different and each is hydrogen, fluorine, chlorine, bromine, iodine, lower alkyl, lower alkoxy, lower alkylthio, lower alkylsulphonyl, sulphamyl, nitro, cyano, di(lower alkyl)amino, lower alkanoylamino, lower alkanoyloxy, lower alkylsulphonylamino, trifluoromethyl or hydroxy;

E is oxygen or sulphur; and

C* is a carbon atom constituting a center of chirality, in combination with a pharmaceutically acceptable nontoxic, inert diluent or carrier.

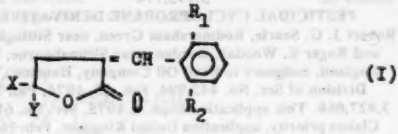
3,993,771

α-BENZYLIDENE LACTONE DERIVATIVES

Tamon Uematsu, Nishinomiya; Katsutoshi Tanaka, Funabashi, both of Japan, and Yuzuru Sanemitsu, Darmstadt, Germany, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Filed Apr. 22, 1975, Ser. No. 570,377
Claims priority, application Japan, Apr. 25, 1974, 49-47349
Int. Cl.² C07D *307/58*
U.S. Cl. 424—279 11 Claims

1. An α-Benzylidene-γ-butyrolactone derivative of the formula,



(I)

wherein R_1 and R_2 are, same or different, hydrogen, halogen and C_1–C_4 alkyl; X and Y are, same or different, hydrogen or C_1–C_4 alkyl; provided that both R_1 and R_2 are not hydrogen simultaneously, and R_1 and R_2 are not hydrogen and halogen respectively when both X and Y are hydrogen simultaneously.

11. A method for controlling plant fungi which comprises applying an effective amount of an α-benzylidene-γ-butyrolactone derivative of claim 1 to the plant fungi.

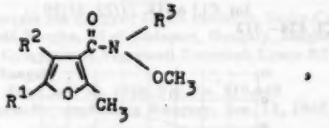
3,993,772

CERTAIN N-METHOXY-N-CYCLOALKYL-2-METHYL-3-FURANCARBOXAMIDES AND FUNGICIDAL METHOD USING SAME

Ernst-Heinrich Pommer, Limburgerhof; Bernd Zeeh, and Friedrich Linhart, both of Ludwigshafen, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen (Rhine), Germany

Filed Nov. 4, 1975, Ser. No. 628,801
Claims priority, application Germany, Nov. 21, 1974, 2455082
Int. Cl.² C07D *307/68*
U.S. Cl. 424—285 5 Claims

1. A furanhydroxamic acid derivative of the formula



where R^1 denotes hydrogen or methyl, R^2 denotes hydrogen or methyl and R^3 denotes cyclopentyl or cyclohexyl.

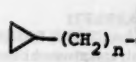
3,993,773

CONTROL OF MITES WITH ESTERS OF CYCLOPROPANE SUBSTITUTED CARBOXYLIC ACIDS

Clive A. Henrick, and Gerardus B. Staal, both of Palo Alto, Calif., assignors to Zoecon Corporation, Palo Alto, Calif.

Division of Ser. No. 489,207, July 17, 1974. This application June 11, 1975, Ser. No. 585,987
Int. Cl.² A01N *9/24*
U.S. Cl. 424—305 16 Claims

1. A composition for the control of mites of the family Tetranychidae or the family Tarsonemidae which comprises a suitable carrier substance and a compound of formula (I):



wherein, *n* is an even integer of 6 to 14 and R is alkyl of 1 to 16 carbon atoms, with the proviso that each compound of formula I contains at least 15 but not more than 26 carbon atoms, said compound being present in the composition in an ovicidally effective amount or larvicidally effective amount.

3,993,774

PESTICIDAL CYCLOPROPANE DERIVATIVES

Robert J. G. Searle, Rodmersham Green, near Sittingbourne, and Roger E. Woodall, Borden, near Sittingbourne, both of England, assignors to Shell Oil Company, Houston, Tex.

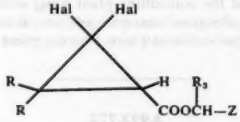
Division of Ser. No. 442,994, Feb. 15, 1974, Pat. No. 3,927,068. This application Sept. 9, 1975, Ser. No. 611,760

Claims priority, application United Kingdom, Feb. 16, 1973, 7685/73

Int. Cl.² A01N *9/24*

U.S. Cl. 424—305 **10 Claims**

1. A method of combating insect or arachnid pests at a locus which comprises applying to the locus a pesticidally effective amount of a cyclopropane derivative of the formula



wherein R represents alkyl of 1 to 6 carbon atoms; each Hal represents a halogen atom; R_3 represents alkyl, cycloalkyl, cyanoalkyl ar alkenyl of up to 6 carbon atoms, alkynyl of up to 8 carbon atoms or a phenyl group; and Z represents phenoxyphenyl or propynyloxyphenyl.

3,993,775

IMMUNO-SUPPRESSIVE AGENTS

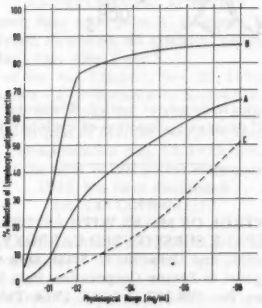
John Williams, 30 Hornby Drive, Nantwich Cheshire, CW5 6JP, England

Filed Dec. 20, 1974, Ser. No. 535,143

Claims priority, application United Kingdom, Apr. 25, 1974, 18226/74

Int. Cl.² A61K *31/23*, *31/20*

U.S. Cl. 424—312 **10 Claims**



1. A method of providing an immuno-suppressive effect in a patient undergoing an organ or tissue transplant which comprises administering to said patient a daily dosage of from 25 mg. to 3 g. of a compound selected from the group consisting of γ-linolenic acid, dihomo-γ-linolenic acid, mixtures thereof, C_1–C_4 alkyl esters thereof, and glyceride esters thereof.

3,993,776

ANOREXIGENIC PROCESS AND COMPOSITION

William T. Comer, and Herbert R. Roth, both of Evansville, Ind., assignors to Mead Johnson & Company, Evansville, Ind.

Division of Ser. No. 406,524, Oct. 15, 1973, Pat. No. 3,919,424, which is a division of Ser. No. 229,202, Feb. 16, 1972, Pat. No. 3,801,631. This application Oct. 21, 1975, Ser. No. 624,346

Int. Cl.² A61K *31/205*

U.S. Cl. 424—316 **4 Claims**

1. A method for exerting an anorexigenic effect in a mammal having the need for reducing food consumption which comprises administering to said mammal an effective anorexigenic dose of a compound selected from the group consisting of 2'-hydroxy-5'-[1-hydroxy-2-(2-methyl-1-phenyl-2-propylamino)ethyl]-methanesulfonanilide and the pharmaceutically effective acid addition and metal salts thereof.

3,993,777

AQUEOUS COMPOSITIONS TO AID IN THE PREVENTION OF BOVINE MASTITIS

Henry Daniel Caughman, Lithonia, and William Edgar Brown, Conyers, both of Ga., assignors to Bio-Lab, Inc., Decatur, Ga.

Filed Aug. 12, 1975, Ser. No. 603,947

Int. Cl.² A61K *31/14*

U.S. Cl. 424—329 **2 Claims**

1. An aqueous composition for use as an aid in the prevention of bovine mastitis, comprising

	Percent
Ethoxylated lanolin	2.50
Glycerine	3.00
C_{12}–C_{16} alkyl dimethyl benzyl ammonium chloride	0.12
C_{12}–C_{16} alkyl dimethyl ethyl ammonium chloride	0.02
Ethyl alcohol	0.12
Isopropyl alcohol	0.01
Water dispersable coloring agent of food grade	0.07
Hydroxyethylcellulose	1.00
Water	Balance

3,993,778

ANTI-ULCEROGENIC PHARMACEUTICAL COMPOSITIONS CONTAINING A 2-AMINO-3,5-DIBROMO-BENZYLAMINE AND METHOD OF USE

Johannes Keck; Matyas Leitold; Sigfrid Puschmann, and Gerd Kruger, all of Biberach an der Riss, Germany, assignors to Boehringer Ingelheim GmbH, Ingelheim am Rhein, Germany

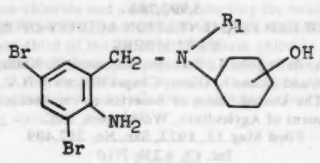
Filed Mar. 25, 1975, Ser. No. 561,860

Claims priority, application Germany, Apr. 3, 1974, 2416142

Int. Cl.² A61K *31/135*

U.S. Cl. 424—330 **2 Claims**

1. The method of inhibiting the formation of stomach ulcers in a warm-blooded animal in need of such treatment, which comprises orally administering to said animal an effective anti-ulcerogenic amount of a compound of the formula



wherein R_1 is hydrogen or methyl, or a non-toxic, pharmacologically acceptable acid addition salt thereof.

3,993,779

METHOD FOR COMBATING HARMFUL MICROORGANISMS USING 2-HYDROXY-BENZOPHENONE DERIVATIVES

Max Dünnenberger, Frenkendorf, and Max Schellenbaum, Muttenz, both of Switzerland, assignors to Ciba-Geigy AG, Basel, Switzerland

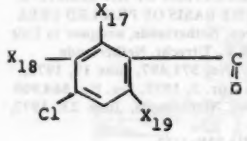
Continuation-in-part of Ser. No. 376,476, July 5, 1973, abandoned, which is a continuation-in-part of Ser. No. 53,026, July 7, 1970, abandoned. This application Apr. 7, 1975, Ser. No. 565,493

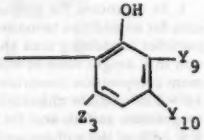
Claims priority, application Switzerland, July 17, 1969, 10936/69

Int. Cl.² A01N 9/26

U.S. Cl. 424—331 **7 Claims**

1. A method for combatting fungi or bacteria, which comprises applying to a site infested by or to be protected against bacteria or fungi an antibacterially or antifungally effective amount of a 2-hydroxybenzophenone of the formula





wherein Z_3 denotes chlorine or methyl, Y_{10} denotes methyl, hydrogen or chlorine, and X_{17}, X_{18}, X_{19} and Y_9 each denote hydrogen, chlorine or methyl, with at least three of the X and Y substituents representing hydrogen and not more than one of the X, Y and Z substituents representing methyl.

3,993,780

PHENOXYETHYLAMINE DERIVATIVES HAVING CENTRAL NERVOUS SYSTEM DEPRESSANT AND ANTI-HYPERTENSIVE ACTIVITY

Masaru Nakao; Kikuo Sasajima, both of Toyonaka; Isamu Maruyama, Minoo; Shigenari Katayama, Takarazuka, and Hisao Yamamoto, Nishinomiya, all of Japan, assignors to Sumitomo Chemical Company, Limited, Japan

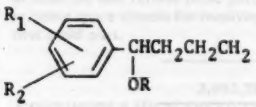
Filed Oct. 18, 1974, Ser. No. 515,889

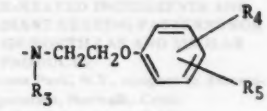
Claims priority, application Japan, Oct. 25, 1973, 48-120516

Int. Cl.² A61K 31/135

U.S. Cl. 424—330 **23 Claims**

1. A compound of the formula:





wherein R_1 and R_2 are each hydrogen, halogen, C_1–C_4 alkyl or C_1–C_4 alkoxy, R_3 is hydrogen or C_1–C_4 alkyl, R_4 and R_5 are each hydrogen or C_1–C_4 alkoxy and R is C_1–C_{10} alkyl, benzyl, phenethyl or benzyl substituted by halogen, lower alkyl or lower alkoxy, non-toxic pharmaceutically acceptable acid addition salts thereof, or N-acylated derivatives thereof selected from the group consisting of N-formyl, N-acetyl, N-propionyl and N-benzoyl compounds thereof.

23. A pharmaceutical composition useful as a tranquilizer, an anti-psychotic agent or an anti-hypertensive agent which comprises an effective tranquilizer, anti-psycotic or anti-hypertensive amount of the compound according to claim 1 and a pharmaceutically acceptable carrier or diluent.

3,993,781

1,6-DIBROMO-1,6-DIDEOXY-DULCITOL AND PHARMACEUTICAL COMPOSITIONS CONTAINING SAME

Piroska Horváth nee Lengyel; László Institoris; Endre Csányi, and László Vargha, all of Budapest, Hungary, assignors to Chinoin Gyogyszer-es Vegyeszeti Termekek Gyara RT, Budapest, Hungary

Filed Jan. 10, 1966, Ser. No. 519,440

Claims priority, application Hungary, Jan. 13, 1965, GO 940

Int. Cl.² A61K 31/045

U.S. Cl. 424—343 **1 Claim**

1. Method of achieving cytostatic action, which comprises administering to a host an effective cytostatic amount of 1,6-dibromo-1,6-dideoxy-D-dulcitol having a m.p. of 187°–190° C.

3,993,782

REPELLENTS FOR THE CONFUSED FLOUR BEETLE

Leonard Jurd, Berkeley, Calif., assignor to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

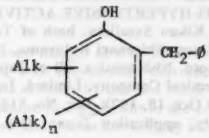
Filed Aug. 14, 1975, Ser. No. 604,854

Int. Cl.² A01N 9/26

U.S. Cl. 424—346 **12 Claims**

1. A method for repelling the confused flour beetle (*Tribolium confusum*), which comprises

exposing said beetle to a repellent amount of a compound of the structure



wherein each Alk is an alkyl radical containing from 1 to 10 carbon atoms and *n* is 0 or 1.

3,993,783

HIGH PROTEIN ACTIVE DRIED BAKERS' YEAST

Arend Langejan, and Basile Khoudokormoff, both of Delft, Netherlands, assignors to Koninklijke Nederlandsche Gist-en Spiritusfabriek N.V., Delft, Netherlands

Division of Ser. No. 627,936, Nov. 3, 1975, which is a continuation of Ser. No. 463,207, April 23, 1974, abandoned, which is a continuation of Ser. No. 133,436, April 12, 1971, abandoned. This application Apr. 2, 1976, Ser. No. 673,143

Claims priority, application United Kingdom, Apr. 14, 1970, 17795/70

Int. Cl.[2] A21D *8/06*; C12C *11/30*

U.S. Cl. 426—18 **5 Claims**

1. In the process of producing baked goods from a dough containing an active dried baker's yeast, the improvement comprising using as the yeast an active dried bakers' yeast having a protein content of 47 to 60% (% N × 6.25, as determined by the Kjeldahl method) based on dry matter content, said dried yeast being produced from a compressed yeast selected from the group consisting of Ng 2031 and Ng 2103 and having a dry matter content of at least 85% by weight, which exhibits (a) an activity of at least 510 when determined by the test procedure consisting of mixing a quantity of the active dried yeast corresponding to 450 mg of dry matter with 100 g of flour and adding 55 ml of an aqueous solution containing 2 g of sodium chloride and thereafter mixing the mass for 6 minutes at 28° C, maintaining the dough obtained at 28° C and measuring the activity as the volume of gas in ml at 28° C and 760 mg Hg evolved in the period from 10 to 175 minutes after the start of mixing the dough; and (b) an activity of at least 385 when measured by the test procedure consisting of maintaining a quantity of the active dried yeast corresponding to 450 mg of dry matter in contact with 8 ml of water for 10 minutes at 28° C, mixing the suspension obtained with 100 g of flour and 47 ml of an aqueous solution containing 2 g of sodium chloride, and thereafter mixing the mass and measuring the activity in the manner specified above and about 2% by weight based on dry matter of at least one member of the group consisting of a swelling agent and wetting agent, the said yeast being dried by dividing a fresh compressed yeast into particles and drying the particles to a dry matter content of at least 85% by weight by passing therethrough a drying gas at a temperature of not more than 160° C in not more than 120 minutes with a drying gas flow so that the temperature of the yeast particles are held within a temperature range of 20° to 50° C.

3,993,784

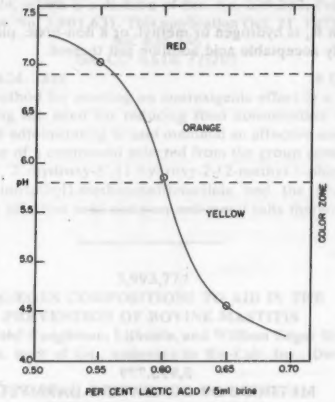
CONTROLLED FERMENTATION ACIDITY OF BRINED CUCUMBERS

Thomas A. Bell; John L. Etchells; Raymond E. Kelling, all of Raleigh, and James L. Olsen, Chapel Hill, all of N.C., assignors to The United States of America as represented by the Department of Agriculture, Washington, D.C.

Filed May 11, 1972, Ser. No. 252,409

Int. Cl. A23b *7/10*

U.S. Cl. 426—49 **7 Claims**



1. In the salting of cucumbers, the process which comprises controlling fermentation using brine acidity as the monitor and continually and rapidly throughout the fermentation process determining brine acidity with tris(hydroxymethyl-)aminomethane as a standard and a small but effective amount of an indicator which undergoes a distinctive color change at the equivalence point in the pH range of about 7.0 to about 4.5, increasing the salt concentration when the brine acid concentration reaches from about 0.55% to about 0.65% weight/volume of the brine solution, the brine acid concentration being determined by neutralizing a relatively small but predetermined amount of the tris(hydroxymethyl)aminomethane containing said indicator with a brine sample containing said brine acid.

3,993,785

PROCESS FOR THE PREPARATION OF AN ADDITIVE FOR MAIZE SILAGE ON THE BASIS OF PRILLED UREA

Johan W. Hoogendonk, Geleen, Netherlands, assignor to Unie Van Kunstmestfabrieken B.V., Utrecht, Netherlands

Continuation-in-part of Ser. No. 371,497, June 19, 1973, abandoned. This application Apr. 3, 1975, Ser. No. 564,900

Claims priority, application Netherlands, June 23, 1972, 7208608

Int. Cl.[2] A23K *1/22*

U.S. Cl. 426—69 **6 Claims**

1. In a process for preparing mineral-enriched particulate urea for an additive to maize silage, the mineral-enriched urea particles containing urea and a mineral enrichment composition in a weight ratio of from 3:2 to 2:3, the mineral enrichment composition comprising, 54 – 66% dicalcium phosphate, 18 – 22% sodium chloride, 9 – 11% sodium sulfate, 6 – 8% magnesium sulfate and the balance consisting essentially of 2.5 – 3% of the sulfates and carbonates of zinc, iron, manganese, copper and cobalt, said process comprising mixing the mineral enrichment composition with a molten urea melt in the said weight ratio and then spraying the resulting mixture and cooling into prills, the improvement of forming prills by spraying the resulting mixture and cooling into prills while avoiding formation of a substantial portion of eutectic mixture

of sodium chloride and urea by conducting the mixing and the spraying steps in a short amount of time such that at most about one-third of the amount of sodium chloride present in the mineral enrichment composition dissolves the urea component of the urea-mineral enrichment mixture, the balance of the sodium chloride remaining in suspension within the resulting enriched urea prill.

3,993,786

PREPARING CHEESE SLICES THAT DO NOT ADHERE

Simon Weil Arenson, 6602 Copper Ridge Drive, Baltimore, Md. 21209

Continuation-in-part of Ser. No. 530,398, Dec. 6, 1974, abandoned. This application Apr. 14, 1975, Ser. No. 567,808

Int. Cl.² A23C *19/02, 19/16*

U.S. Cl. 426—99 **13 Claims**

1. A method of preventing cheese slices from adhering to one another during refrigeration when packaged stacked one slice atop another slice with no non-food barrier between each slice comprising applying a coating of hardened fat in powder form to at least one contacting surface of each slice in an amount sufficient to prevent the cheese slices from adhering to one another during refrigeration and to inhibit loss of moisture in the cheese slices.

12. A cheese slice coated with a hardened fat in powder form in an amount at least sufficient to prevent adherence of said slice to another slice of cheese during refrigeration and to at most lose a minimum amount of water, wherein said fat is hardened milk fat or hardened cream fat having a melting point of at least 105° F, a softening point of at least 37° F and an iodine value of from 0 to about 20.

3,993,787

ROTARY MOLDER

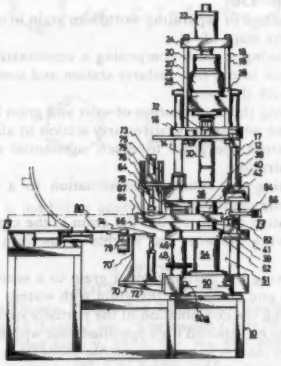
Hirotomo Nakabayashi, Yokohama; Kikuo Ohura; Nobuhito Fujita, both of Fujisawa; Shintaro Miyakawa, Yamato; Tukasa Saito, Fujisawa, and Makoto Higuchi, Kawasaki, all of Japan, assignors to Nippon Oil Seal Industry Co., Ltd., Tokyo, Japan

Filed Nov. 7, 1975, Ser. No. 630,013

Claims priority, application Japan, Nov. 14, 1974, 49-13130

Int. Cl.² B29H *9/10*

U.S. Cl. 425—125 **29 Claims**



1. A molding machine for producing products of a rubber-like resilient material, such as oil seals, including a main base, a first mold part stationarily supported in axial spaced relationship to the main base and substantially parallel to the main base, a second base between the main base and the first mold part movable axially toward and away from the first mold part, a second mold part supported by the second movable base, a holder located between and axially spaced from the first mold part and second movable base, means mounting the holder for limited axial movement and rotary movement in a plane parallel to the second movable base and first mold part, said holder carrying at least two diametrically opposite further mold parts spaced apart an equal distance from the axis of rotary movement of the holder, one of the further mold parts, during a molding cycle, being in substantial registry with the first and second mold parts, means for moving the second movable base towards and away from the holder, and means for introducing a molding material into the first mold part, the arrangement being such that movement of the second movable base towards the holder initially precisely positions the second movable base relative to the holder and the second mold part into operative relationship to the one further mold part, and continued movement of the second movable base moves the holder toward the first mold part until the first mold part and at least the one further mold part are assembled to provide a molding space therein for receiving molding material from the first mold part.

3,993,788

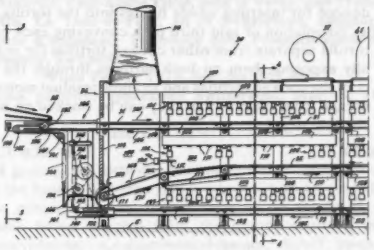
CONTINUOUS HIGH-SPEED COOKING AND COOLING METHOD USING PRE-HEATED INGREDIENTS AND PREDETERMINED RADIANT HEATING PATTERNS FOR THE PRODUCTION OF TORTILLAS AND SIMILAR PRODUCTS

John G. Longenecker, Ozone Park, N.Y., assignor to Automation International Corporation, Norwalk, Conn.

Filed Apr. 11, 1975, Ser. No. 567,425

Int. Cl.² A21B *1/42*

U.S. Cl. 426—243 **17 Claims**



1. In a method for producing tortillas wherein the tortilla dough is shaped into the desired blank shape and then the blank is cooked in an oven, the improved method for automatically producing cooked tortillas having commercially desirable and consistent predetermined characteristics including a moist interior layer surrounded by top and bottom flexible skins which are attractively lightly browned and in which the top browned skin has sufficient integrity, flexibility and self-supporting strength that it can be lifted away from such moist interior layer by the consumer for inserting edible fillings, comprising the steps of:

mixing together flour and liquid to form a tortilla dough,

pre-heating the tortilla dough,

forming the such dough into pre-heated blanks for tortillas,

feeding the pre-heated tortilla blanks in an oven along a first path supported upon an infrared radiation reflecting conveyor web having low mass and multiple spaces therein,

said first path extending past a first series of infrared heaters located above and directed at top surfaces of the blanks,

said first series of infrared heaters initially applying intensive radiant heating effect to said top surfaces and thereafter applying progressively decreasing radiant heating effect to said top surfaces, as said blanks are fed along said first path, for searing and cooking said top surfaces in order to begin forming a skin thereon,

turning said blanks over after they have completed said first path for facing upwardly the bottom surfaces of the inverted blanks,

feeding the inverted blanks in the oven along a second path supported upon an infrared radiation reflecting conveyor web having low mass and multiple spaces therein,

said second path extending past a second series of infrared heaters located above and directed at the lower surfaces of the inverted blanks,

said second series of infrared heaters initially applying intensive radiant heating effect to said bottom surfaces and thereafter applying progressively decreasing radiant heating effect to said bottom surfaces, as said inverted blanks are fed along said second path, for searing and cooking said bottom surfaces in order to form a skin thereon,

turning said blanks over after they have completed said second path for again facing upwardly the top surfaces of the blanks,

feeding the blanks in the oven along a third path supported upon an infrared radiation reflecting conveyor web having low mass and multiple openings therein,

said third path extending past a third series of infrared heaters directed at the top surfaces of the blanks,

said third series of infrared heaters initially applying intensive radiant heating effect to said top surfaces and thereafter applying progressively decreasing radiant heating effect to said top surfaces, as said blanks are fed along said third path, for completing the formation of top browned skins on the tortillas and for forming steam beneath said top browned skins for blistering them away from a moist interior layer with said top browned skins having sufficient integrity, flexibility and self-supporting strength to be lifted away from the moist interior layer if desired for inserting edible fillings into the tortilla, and

after completion of said third path conveying each cooked tortilla separate from other cooked tortillas for individually exposing them on both surfaces through the air to cool the cooked tortillas and to allow residual moisture to escape from them so that they can be stacked up without sticking together.

3,993,789

RED PIGMENT AND PROCESS

Hans Rudolf Moll, and David Robert Farr, both of Vaud, Switzerland, assignors to Societe d'Assistance Technique pour Produits Nestle S.A., Lausanne, Switzerland

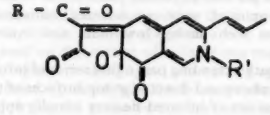
Filed Oct. 16, 1975, Ser. No. 623,054

Claims priority, application Switzerland, Nov. 7, 1974, 14887/74

Int. Cl.² A23L *1/27, 1/275*

U.S. Cl. 426—250 **13 Claims**

1. A red colorant having the general formula



in which

R represents an aliphatic radical, and

R′ represents the radical of a compound of the formula $H_2N—R'$, which compound is an amino sugar, a polymer of an amino sugar, a polyamino acid or an amino alcohol.

3,993,790

PROCESS OF MAKING COLLAGEN CASINGS USING MIXED ACIDS

Noel I. Burke, Danville, Ill., assignor to Tee-Pak Inc., Chicago, Ill.

Filed Mar. 22, 1976, Ser. No. 668,876

Int. Cl.² A22C *13/00*

U.S. Cl. 426—277 **4 Claims**

1. A process for preparing tubular collagen food casings which comprises preparing comminuted particles of collagen, adding the collagen particles to water to prepare an aqueous dispersion containing 2 to 8 percent by weight collagen and then adjusting the pH of the aqueous dispersion to between 2.5 to 3.7 with a mixture of strong and weak acids to effect substantial swelling of the dispersed collagen, the strong acid having a disassociation constant in water at 25° C of more than 1×10^{-3} and the weak acid having disassociation constant between 1×10^{-6} and 1×10^{-3} in water at 25° C and wherein the acid mixture contains 0.12 to 0.24% by weight of the strong acid and 0.1 to 1.5% by weight of the weak acid, and extruding the aqueous dispersion into a coagulation bath to form the casing.

3,993,791

CONTINUOUS LAUTERING

David H. Breed, Webb Court, Va., and Llewellyn E. Clark, Pittsfield, Mass., assignors to Beloit Corporation, Beloit, Wis.

Continuation-in-part of Ser. No. 409,249, Oct. 24, 1973, abandoned. This application May 5, 1975, Ser. No. 574,273

Int. Cl.² C12C *7/00*

U.S. Cl. 426—436 **3 Claims**

1. The method of separating wort from grain in mash which comprises the steps of:

1. Introducing a mash comprising a combination of wort and grain into a first reslurry station and combining the mash with thin wort;
2. Retaining the combination of wort and grain for a specified time within the first reslurry station to allow soluble solids from the grain to reach substantial equilibrium concentration;
3. Directing the resultant combination to a continuous decanting centrifuge;
4. Separating the wort from the grain in the centrifuge;
5. Removing the wort and soluble solids from the centrifuge;
6. Removing the partially spent grain to a second reslurry station and combining the grain with water;
7. Allowing the combination of the partially spent grain and water to be retained for a specified time within the second reslurry station to convert soluble solids from the grain to reach substantial equilibrium concentration;
8. Directing the combination from the second reslurry station to a second screening centrifuge;
9. Separating the wort from the grain in the second centrifuge by a continuous screening centrifugal action to form a thin wort;
10. Removing the spent grains and thin wort from the second centrifuge; and
11. Directing the thin wort to the first reslurry station for combination with the mash.

3,993,792

FLAVORING AGENT

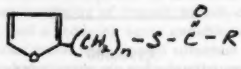
Max Winter, Geneva; Fritz Gautschi, Vaud; Ivon Flament; Max Stoll, both of Geneva, all of Switzerland, and Irving M. Goldman, Niantic, Conn., assignors to Firmenich & Cie, Geneva, Switzerland

Continuation of Ser. No. 243,866, April 13, 1972, abandoned, which is a division of Ser. No. 70,560, Sept. 8, 1970, , which is a continuation of Ser. No. 543,069, April 18, 1966, abandoned, which is a continuation-in-part of Ser. No. 452,342, April 30, 1965, abandoned. This application Jan. 23, 1975, Ser. No. 543,387

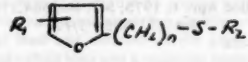
Int. Cl.[2] A23L *1/234*

U.S. Cl. 426—535 19 Claims

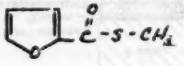
1. A process for the alteration of the natural flavor of soluble coffee material which comprises adding thereto a minor, but effective flavor-modifying amount of a compound selected from those represented by the formulae:



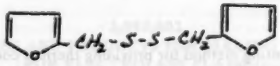
wherein R is hydrogen, methyl, ethyl, propyl, butenyl or propenyl and *n* is 1 or 2; and



wherein R_1 is hydrogen or methyl, R_2 is methyl, propyl, isopropyl or furfuryl and *n* is 0, 1 or 2 with the provision that, if R_1 is hydrogen and *n* is 1, R_2 is not methyl or furfuryl; and



and



and

wherein R is methyl or acetyl.

3,993,793

SOFT ICE CREAM

David John Finney, Palmerston North, New Zealand, assignor to Thomas J. Lipton, Inc., Englewood Cliffs, N.J.

Filed June 9, 1975, Ser. No. 585,404

Int. Cl.[2] A23G *9/02*

U.S. Cl. 426—565 4 Claims

1. A conventional ice cream which is spoonable at −20° C. and stable at eating temperatures comprising (a) a sufficient amount of freezing point depressants such that the log C, where C is the penetrometer value of the ice cream, at −20° C. is less than 2.8 and (b) 0.15 to 1.0% by weight of a stabilizer system consisting essentially of (i) microcrystalline cellulose in an amount of 0.1 to 0.8% by weight of the ice cream and (ii) carboxymethyl cellulose, with or without a galactomannan gum, the weight ratio of (i) to (ii) being in the range 4:1 to 1:4, and, in the absence of a galactomannan gum, the weight ratio of microcrystalline cellulose to carboxymethyl cellulose being not greater than 3:1.

3,993,794

METHOD FOR TEXTURIZING PROTEINS

John Emile Bernardin, El Sobrante, Calif., assignor to The United States of America as represented by the Secretary of Agriculture, Washington, D.C.

Filed Jan. 15, 1976, Ser. No. 646,123

Int. Cl.[2] A23J *3/00*

U.S. Cl. 426—574 15 Claims

1. A process for texturizing a cereal grain protein capable of forming microfibrillar aggregates, which comprises

a. dissolving the protein in water,

b. adjusting the pH of the solution to 5.0 to 6.0,

c. aggregating the protein molecules into microfibrils of about from 50 to 100 angstroms in diameter,

d. aligning the microfibrils in a parallel arrangement, and

e. causing the so-aligned microfibrils to collide to form a texturized protein.

3,993,795

PROCESS FOR FORTIFYING FOODSTUFFS WITH PROLYSINES

Jean Mauron; Paul-Andre Finot, both of Vevey, and Francoise Mottu, La Tour-de-Peilz, all of Switzerland, assignors to Societe d'Assistance Technique pour Produits Nestle S.A., Lausanne, Switzerland

Filed Feb. 6, 1975, Ser. No. 547,440

Claims priority, application Switzerland, Mar. 5, 1974, 3123/74

Int. Cl.[2] A23L *1/10*

U.S. Cl. 426—618 8 Claims

1. A process for fortifying foodstuffs which comprises adding to the foodstuff at least one pro-lysine in an amount effective to enhance the nutritional value of the foodstuff, said prolysine being selected from the group consisting of ε-aminoacyl-lysine; α,ε-diaminoacyl-lysines, Schiff bases of lysine, lysine fixed on prolyacrolein (13.5%) and lysine fixed on peroxidised starch, said pro-lysine being a metabolic substitute of L-lysine which is converted on ingestion in human or animal metabolism into free L-lysine or directly assimilable bound L-lysine.

3,993,796

HIGH FAT FEED PELLETS AND METHOD OF MANUFACTURE

Frederick H. Steinke, Crestwood, Mo., assignor to Ralston Purina Company, St. Louis, Mo.

Filed May 15, 1974, Ser. No. 469,990

Int. Cl.[2] A23L *1/36*

U.S. Cl. 426—630 9 Claims

1. A process for manufacturing hard, dry high fat animal feed pellets, containing from above 20 to about 50% fat, characterized by the presence of high levels of fat prior to pelleting and comprising the steps of comminuting oleaginous seeds to a finely divided state, mixing the comminuted seeds with from 25 to about 45% of its weight of a spray dried blend of vegetable oil and protein isolate, said spray dried blend containing from about 40 to about 65% oil, heating the resultant mixture of comminuted seeds and spray dried blend to a temperature of from about 170° F. to about 200° F. with steam and then pelleting said mixture.

3,993,797

GLASS BODY HAVING A FLUORESCENT PATTERN INWARDLY OF A SURFACE THEREOF AND METHOD OF MAKING SAME

Takeo Ichimura, and Teruo Kaneko, both of Tokyo, Japan, assignors to Nippon Kogaku K.K., Tokyo, Japan

Division of Ser. No. 358,467, May 9, 1973, Pat. No. 3,944,697. This application July 22, 1975, Ser. No. 598,122

Claims priority, application Japan, May 12, 1972, 47-46482; May 12, 1972, 47-46483

Int. Cl.² B05D 5/12

U.S. Cl. 427—64 5 Claims

1. A method of making a glass exhibiting fluorescence in a desired pattern when subjected to ultra-violet radiations, which comprises contacting a surface of a fluorescent glass uniformly containing ion-exchangeable alkali-metal ions with a material containing second ions which are ion-exchangeable for the alkali-metal ions in a desired pattern and heating a fluorescent glass and the material at a temperature between about 200° to 450° C for about 15 to 90 minutes in an atmosphere containing about 0.5 to 5% sulphur trioxide by weight to effect the ion-exchange of the second ions for the alkali-metal ions in at least the surface of the glass body whereby the second ions extinguish the fluorescent properties of the part in which the second ions is exchanged for the alkali-metal ions.

3,993,798

CURED OPAQUE COATING WITH HIGH HIDING POWER PRODUCED FROM NORMALLY TRANSPARENT POLYESTER PASTE FILLER COMPOSITIONS

Horst Brose; Karl Dieter Depping, both of Hiltrup; Dietrich Hentschel, Wolbeck; Bernard Kostevc, Munster, and Klaus Schmidt, Hiltrup, all of Germany, assignors to BASF Farben & Fasern Aktiengesellschaft, Hamburg, Germany

Continuation of Ser. No. 337,064, March 1, 1973, abandoned. This application July 14, 1975, Ser. No. 595,609

Claims priority, application Germany, June 19, 1972, 2229637

Int. Cl.² B05D 3/06

U.S. Cl. 427—44 6 Claims

1. In the process for manufacturing cured coatings from radiation curable polyester compositions containing unsaturated polyesters, copolymerizable monomers, sensitizers, accelerators, normal additives and filler materials of low hiding power, comprising applying said polyester composition to a substrate and curing by ionizing rays, the improvement comprising said polyester composition consisting essentially of:

I. filler materials having refractive indices not exceeding 1.70 in a weight ratio of about 150 percent related to the sum of weights of

a. polyesters; and

b. copolymerizable monomers being present in a weight ratio a ; b between 10 : 12 to 10 : 40;

II. 0.1 to 15 percent by weight synthetic resins of the classes nitrocellulose, cellulose-acetobutylate, alkyd resins, ketone resins, saturated polyester resins, epoxide resins, polyurethane resins, amine aldehyde resins, phenolic resins, acrylate resins, methacrylate resins, homopolymers of vinyl chloride, copolymers of vinyl chloride, vinyl acetate, vinyl propionate, vinyl compounds and polyolefin resins; and

providing opaque coating with said curing with ionizing rays.

3,993,799

ELECTROLESS PLATING PROCESS EMPLOYING NON-NOBLE METAL HYDROUS OXIDE CATALYST

Nathan Feldstein, Princeton, N.J., assignor to Surface Technology, Inc., Princeton, N.J.

Continuation-in-part of Ser. No. 512,224, Oct. 4, 1974, abandoned. This application Aug. 26, 1975, Ser. No. 607,506

Int. Cl.² C23C 3/02; B05D 3/06

U.S. Cl. 427—53 16 Claims

1. An improved process for preparing dielectric substrates for electroless plating comprising

a. coating the surface of a dielectric substrate to be plated with a hydrous oxide colloid of a non-precious metal selected from the group consisting of cobalt, iron, nickel and copper and alloys of said metals, and mixtures thereof; and

b. reducing said metal to a lower or zero valence state with a chemical reducing agent to effect a catalytic surface receptive to electroless plating initiation.

3,993,800

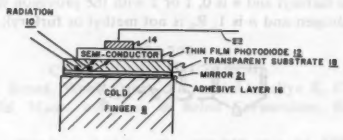
MOUNTING TECHNIQUE FOR THIN FILM SCHOTTKY BARRIER PHOTODIODES

Robert E. Callender, Fairfax County, Va., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Apr. 1, 1975, Ser. No. 564,178

Int. Cl.² B05D 5/12

U.S. Cl. 427—74 7 Claims



1. A mounting method for providing thermal compatability between a thin film photodiode and a cryogenic cold finger comprising the steps of:

providing a ⅛ inch thick barium fluoride substrate transparent to infrared radiation;

evaporating in a vacuum environment a mirrored surface comprised of consecutive layers of chrome and gold on one side of said substrate;

depositing a layer of thin film photodiode material on a second side of said substrate that is opposite said mirrored surface;

depositing a plurality of opaque metal Schottky barrier contacts on said photodiode material to form a plurality of photodiodes between said layer of thin film photodiode material and said Schottky barrier contacts;

bonding a plurality of electrical leads to said plurality of said barrier contacts wherein said plurality of electrical leads are connected to an infrared imaging system;

providing a cryogenic cold finger;

attaching said mirrored surface to said cold finger by providing a vacuum compatible adhesive layer therebetween wherein said ⅛ inch thick barium fluoride substrate is large enough to be thermally compatible with said cryogenic cold finger; and

irridiating said mirrored surface with infrared radiation whereby said mirrored surface back reflects said infrared radiation through said substrate into said layer of thin film photodiode material for creating photocurrent at said plurality of photodiodes.

3,993,801

CATALYTIC DEVELOPER

Nathan Feldstein, Princeton, N.J., assignor to Surface Technology, Inc., Princeton, N.J.

Filed Feb. 18, 1975, Ser. No. 550,433
Int. Cl.² B05D *3/04, 3/10*
U.S. Cl. 427—98 21 Claims

1. An improved developer solution useful in developing substrates primed with non-precious metal ions, said developer solution comprising ions of a metal selected from the group consisting of copper, nickel, cobalt and mixtures thereof, and a reducing agent capable of first reducing the non-precious metal ions of said substrate to the metallic state and then heterogeneously reducing the metal ions in said developer solution to their metallic state, said reducing agent and said ions in solution being present in a molar ratio of at least 1:1.

5. An improved process for developing non-precious metal primed substrates comprising contacting said substrates with a developer solution comprised of ions of a metal selected from the group consisting of copper, nickel, cobalt and mixtures thereof, and a reducing agent capable of first reducing the non-precious metal ions on said substrate to the metallic state and then heterogenously reducing the metal ions in said developer solution to their metallic state, said reducing agent and said ions in solution being present in a molar ratio of at least 1:1.

21. An improved process for electroless nickel plating on a non-metallic substrate primed with copper ions comprising

A. Contacting said substrate with a developer solution comprising at least one member of the group consisting of nickel and cobalt ions and a reducing agent selected from the group consisting of amineboranes, borohydrides and mixture thereof, said reducing agent and said metal ions being present in a molar ratio of at least 1:1, and

B. Contacting said substrate with an electroless plating bath comprising nickel ions and a hypophosphite reducing agent whereby a nickel layer is deposited on said substrate.

3,993,802

PROCESSES AND PRODUCTS FOR MAKING ARTICLES FOR ELECTROLESS PLATING

Joseph Polichette, South Farmingdale; Edward J. Leech, Oyster Bay, and Francis J. Nuzzi, Freeport, all of N.Y., assignors to Photocircuits Division of Kollmorgen Corporation, Glen Cove, N.Y.

Continuation-in-part of Ser. Nos. 167,432, July 29, 1971, Pat. No. 3,772,056, and Ser. No. 227,446, Feb. 18, 1972, Pat. No. 3,907,621. This application July 11, 1974, Ser. No. 487,748
The portion of the term of this patent subsequent to Nov. 23, 1993, has been disclaimed.
Int. Cl.² B44D *1/02;* B32B *15/00;* G03C *5/24;* C25D *5/00*
U.S. Cl. 427—98 68 Claims

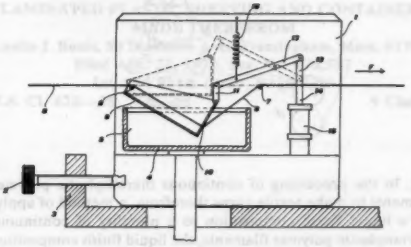
1. In a process for producing metallized articles by contacting a base sensitized to the reception of an electroless metal with an electroless metal deposition solution, the steps which comprise depositing on said base a layer of radiationsensitive composition by treating said base with a solution having a pH between about 1.5 to 4.0 as well as a minor content by weight of at least one halide ion of the group consisting of chloride, bromide and iodide ions and comprising a reducible salt of a non-noble metal, with the cations of said metal present in a larger proportion of equivalents than said halide ions, a radiation-sensitive reducing agent for said salt and a secondary reducer in an aqueous medium, and exposing said layer to radiant energy to reduce said metal salt to metallic nuclei thereby producing a non-conducting layer on said base of said metallic nuclei capable of directly catalyzing the deposition on said nuclei of metal from an electroless metal bath.

3,993,803

METHOD OF TINNING COIL TERMINALS

Giuseppe Camardella, Viale della Liberta, 118, 20031 Cesano Maderno, Milan, Italy

Continuation of Ser. No. 519,295, Oct. 30, 1974, abandoned, which is a continuation of Ser. No. 299,166, Oct. 19, 1972, abandoned. This application Oct. 29, 1975, Ser. No. 626,844
Int. Cl.² C23C *1/04*
U.S. Cl. 427—117 1 Claim



1. A process for tinning the terminals of a coil wire comprising guiding a wire from which the coil is made along a rectilinear horizontal path over a melted tin bath, stopping the forward advancement of the wire, deviating said stopped wire from said rectilinear horizontal path downwardly so that a predetermined length of said wire is positioned below the surface of said bath and a section of said predetermined length of said wire is in submerged contact with said melted tin bath, starting the advancement of the wire and simultaneously returning said predetermined length of wire to said rectilinear horizontal path and continuing the advancement of said wire along the rectilinear horizontal path a distance equal to the length of the coil before again stopping the forward advancement of the wire and repeating the immersion and advancing process at the termination of said distance.

3,993,804

SULFURIC ACID PAINT STRIPPER FOR RUBBER

Newton W. McCready, Newtown Square, and Robert W. Koch, Norristown, both of Pa., assignors to Amchem Products, Inc., Ambler, Pa.

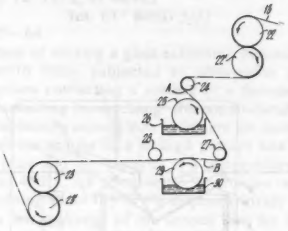
Filed Apr. 2, 1975, Ser. No. 564,586
Int. Cl.² C09D *9/00*
U.S. Cl. 427—140 9 Claims

1. A process for removing organic resinous material from a rubber surface comprising contacting an organic resin coated rubber surface with a homogeneous liquid stripping solution comprising sulfuric acid wherein said sulfuric acid concentration is from about 55 weight percent to about 99.99 weight percent, and anionic wetting agent, wherein said anionic wetting agent is preselected so as to remain in a stable fluid state in combination with said sulfuric acid and wherein said anionic wetting agent is present in the solution in an amount from about 0.025 weight percent to the limit of its solubility and wherein in the solution, water is present in an amount not to exceed about 40 weight percent said contact being at a temperature of from about 40° C to about 82° C for a time sufficient to remove said resin from said surface.

3,993,805
METHOD OF APPLYING LIQUID FINISH COMPOSITION TO FILAMENTS

John S. Roberts, Ellicott City, Md., assignor to Concorde Fibers Inc., Columbia, Md.

Continuation of Ser. No. 276,617, July 31, 1972, abandoned. This application May 17, 1974, Ser. No. 470,771
Int. Cl.² B05D 1/28; D06B 3/04
U.S. Cl. 427—175 11 Claims

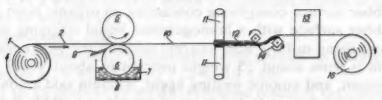


1. In the processing of continuous thermoplastic polymer filaments to make textile yarns therefrom, a method of applying a liquid finish composition to a plurality of continuous thermoplastic polymer filaments, the liquid finish composition having the function of facilitating subsequent mechanical handling and processing of the filaments, comprising arranging the filaments side-by-side in a substantially planar array, driving said array with a first driving surface before contacting the filaments with the finish composition, said driving surface moving at a first peripheral speed in the direction of movement of the array, contacting one face of the array with the peripheral surface of a first roller carrying an applied finish composition at a first location, then contacting the other face of the array with the peripheral surface of a second roller carrying the same finish composition at a second location spaced apart and downstream of said first location, while driving said first and second rollers at a peripheral speed in the direction of the movement of the array slower than the peripheral speed of said first driving surface, and then driving the array with a second driving surface moving at a peripheral speed in the direction of the movement of the array faster than the first driving surface so as to control the filaments at a tension within a range selected, so that upon contacting the array with said first and second rollers, the finish is applied to all the filaments uniformly from filament to filament.

3,993,806
FLOCKING NON-WOVEN FABRICS

Graham Athey, Harrogate, England, assignor to Imperial Chemical Industries Limited, London, England

Filed Mar. 9, 1972, Ser. No. 233,149
Claims priority, application United Kingdom, Feb. 22, 1971, 5094/71
Int. Cl.² B05D 1/14, 1/16, 1/36
U.S. Cl. 427—206 4 Claims



1. A process for making a bonded non-woven fabric having a non-woven base layer and flock fibres adhered thereto comprising sequentially the steps of

i. forming a non-woven web containing multi-component fibres or filaments, at least one of which components can be rendered adhesive by a treatment which leaves the other components unaffected,

ii. treating the non-woven web to render adhesive said component of the said multi-component fibres or filaments and thereby causing bonds to form between contiguous fibres or filaments,

iii. applying an adhesive for at least some of the fibres and filaments of the base web and also for the flock fibres to the bonded non-woven web in such quantities that a substantial proportion of the continuous fibres or filaments are coated with adhesive, the adhesive not being derived from the multi-component fibres or filaments and not spanning the interstices between the fibres or filaments of the web,

iv. applying flock fibres to both surfaces of the adhesively coated non-woven web by suspending the flock fibres in a stream of gaseous fluid and directing the stream into and through the non-woven web so that said flock fibres are oriented in all directions and a majority of said flock fibres penetrate into or through said non-woven layer and

v. drying the adhesive.

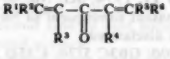
3,993,807
ACTIVATION OF SUBSTRATES FOR ELECTROLESS METALLIZATION WITH ZERO VALENT PALLADIUM COMPLEX

Joachim Stabenow, Weinheim; Gerd Wunsch, Speyer; Paul Deigner, Weisenheim; Franz-Josef Mueller, Limburgerhof; Werner Loeser, Ludwigshafen, and Werner Steck, Mutterstadt, all of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Rhine, Germany

Filed Oct. 24, 1975, Ser. No. 625,657
Claims priority, application Germany, Oct. 29, 1974, 2451217
Int. Cl.² C23C 3/02; B05D 3/02
U.S. Cl. 427—229 10 Claims

1. A method of plating a substrate which comprises contacting the surface of the substrate with a solution of a zero-valent palladium complex in an organic solvent, the ligands of said complex being selected from the group consisting of

a. an unsaturated ketone of the formula



wherein R^1, R^3, R^4 and R^6 are hydrogen or alkyl of 1 to 5 carbon atoms and R^2 and R^5 are alkyl of 1 to 5 carbon atoms or aryl or cycloalkyl of 6 to 11 carbon atoms, and

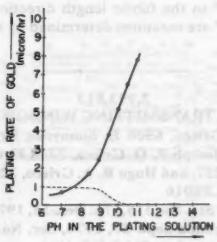
b. a phosphite of the formula

wherein R is alkyl or aryl, together with an olefinically or acetylenically unsaturated organic compound of 3 to 16 carbon atoms which are π-acceptors in the case of said olefinically unsaturated compounds and which act as π-acceptors and ligands in the palladium (O) complexes in the case of said acetylenically unsaturated compounds, decomposing the said complex on the substrate at from 100° to 300° C and depositing a metal coating on the so-treated substrate by contacting said substrate with an electroless chemical plating bath.

3,993,808
METHOD FOR ELECTROLESS PLATING GOLD DIRECTLY ON TUNGSTEN OR MOLYBDENUM

Yoshiharu Inaba, and Toru Kawanobe, both of Kodaira, Japan, assignors to Hitachi, Ltd., Japan

Continuation-in-part of Ser. No. 280,120, Aug. 14, 1972, abandoned. This application Feb. 4, 1975, Ser. No. 546,923
Claims priority, application Japan, Aug. 13, 1971, 46-61059; Aug. 13, 1971, 46-61060; Aug. 13, 1971, 46-61061
Int. Cl.² C23C *3/00*
U.S. Cl. 427—377 26 Claims

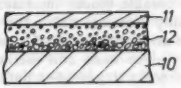


1. A method for electroless plating gold directly on a metal comprising the steps of preparing a metallic body made up substantially of an element selected from the group consisting of tungsten and molybdenum, preparing an aqueous plating solution including a water soluble gold compounds and an alkaline material consisting of ammonium hydroxide and having a pH not less than 8 and not more than 12, and directly exposing a surface of said metallic body to said plating solution to plate gold directly on the surface of said metallic body; said gold compound being a complex cyanide salt and the plating solution containing a water-soluble salt of Zn or Ni capable of forming a cyanide complex with cyano groups obtained from said gold compound.

3,993,809
METHOD OF MEASURING A TWO-DIMENSIONAL TEMPERATURE DISTRIBUTION

Karl-Wilhelm Schranz, Odenthal-Hahnenberg; Wolfgang Hunicke, Leverkusen, and Hildegard Schnoring, Wuppertal, all of Germany, assignors to AGFA-Gevaert, A.G., Leverkusen, Germany

Filed Mar. 6, 1975, Ser. No. 556,151
Claims priority, application Germany, Mar. 12, 1974, 2411767
Int. Cl.² C09K *3/34*
U.S. Cl. 428—1 12 Claims



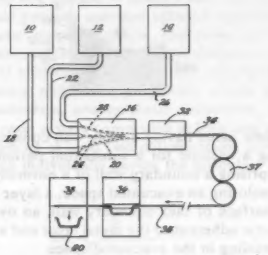
1. A method of measuring a two-dimensional temperature distribution by means of a thermographic film consisting essentially of a layer containing temperature-sensitive liquid crystals and of an anti-reflection layer, wherein the improvement comprises using a layer combination comprising an auxiliary substrate and arranged thereon, a thermographic film, and removing the auxiliary substrate from the thermographic film before temperature measurement, the thermographic film comprising a layer containing temperature-sensitive liquid crystals and an anti-reflection layer, the thermographic film having an elasticity modulus of 0.05 to 1.0 kp/mm² and an elongation at break of more than 5% of its length when free from load.

3. A thermographic layer combination which comprises an auxiliary substrate and supported thereon a thermographic film comprising a layer containing temperature-sensitive liquid crystals and an anti-reflection layer, the thermographic film having an elasticity modulus of 0.05 to 1.0 kp/mm² and an elongation at break of more than 5% of its length when free from load, and the layer adhesion forces between the thermographic film and the auxiliary substrate being small enough to enable the auxiliary substrate to be removed from the thermographic film without destruction of the latter.

3,993,810
LAMINATED PLASTIC SHEETING AND CONTAINERS MADE THEREFROM

Laszlo J. Bonis, 50 Dinsmore Ave., Framingham, Mass. 01701

Filed Apr. 23, 1975, Ser. No. 570,587
Int. Cl.² B65D *11/00*; B32B *7/00*
U.S. Cl. 428—35 9 Claims



1. In a plastic container having outer and inner surfaces and made of a bonded, multi-layer plastic sheet, the improvement comprising: an outer surface-defining layer of a poly(acrylonitrile-butadiene-styrene) containing from 20 to 40 percent by weight of acrylonitrile units; and an inner surface-defining layer of a solid, relatively inert polymer free of acrylonitrile units, to prevent nitrile migration into the contained product; and a bonded, intermediate layer, disposed between said outer and inner surface-defining layers, comprising poly(acrylonitrile-butadiene-styrene) having from 10 to 20 percent by weight of acrylonitrile units and fewer acrylonitrile units than said outer surface-defining layer.

7. The method of simultaneously extruding a first plastic sheet comprising poly(acrylonitrile-butadiene-styrene) containing from 20 to 40 percent by weight of acrylonitrile units; a second plastic sheet of poly(acrylonitrile-butadiene-styrene) containing from 10 to 20 percent by weight of said acrylonitrile units, and fewer acrylonitrile units than said first sheet; and a third plastic sheet of a relatively inert polymer free of acrylonitrile units; and pressing said sheets into unitary, overlying relationship with each other, with said second sheet being positioned between said first and third sheets, while said sheets are in heat-softened condition, to create a unitary, coextruded member from said three sheets.

3,993,811
THERMAL INSULATING PANEL FOR USE IN AN INSULATIVE CONTAINER AND METHOD OF MAKING SAID PANEL

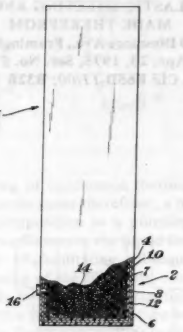
Wilhelm E. Walles, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 497,588, Aug. 15, 1974, Pat. No. 3,921,844, which is a continuation-in-part of Ser. No. 305,451, Nov. 10, 1972, Pat. No. 3,828,960. This application Apr. 25, 1975, Ser. No. 571,451

The portion of the term of this patent subsequent to Nov. 25, 1992, has been disclaimed.

Int. Cl.² B32B *1/06*, *5/16*; C23D *3/00*; A47J *41/00*

U.S. Cl. 428—35 **14 Claims**



1. A plastic panel having double wall construction capable of retaining a vacuum for a substantial period of time, said panel comprising a boundary wall of a normally solid, plastic material enclosing an evacuated space, a layer of metal on at least one surface of said boundary wall, an overcoating of a barrier plastic adherent to the metal layer and a gas-absorbing material residing in the evacuated space.

14. The plastic panel of claim 1 as a component part of a thermal insulative container.

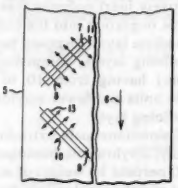
3,993,812
UNBONDED FIBROUS NON-WOVEN SHEET AND ARTICLES MADE THEREFROM

Samir Costandi Debbas, Hendersonville; Arthur John Herrman, Old Hickory, and Alexander Gregory Swystun, Nashville, all of Tenn., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Mar. 6, 1975, Ser. No. 555,986

Int. Cl.² B32B *5/12*; D04H *3/02*

U.S. Cl. 428—35 **3 Claims**



1. An unbonded fibrous non-woven sheet comprising four layers of continuous isotactic polypropylene filaments, each layer comprising 22–28% of the total weight of the fibrous sheet, a first outer layer and two inner layers of said sheet having from about 8–32% by weight of filament segments having a break elongation of 400–800% with the second outer layer having from about 50–100% by weight of such segments, the remaining filament segments of said first outer layer and two inner layers having a tenacity of between 3.0 and 5.0 grams per denier, a denier of 6–32 and a percent break elongation of under 350%, one of said inner layers having a majority of filament lengths lying at an angle of +20° to +70° relative to the machine direction and said other inner layer having a majority of filament lengths lying at an angle of −20° to −70° relative to the machine directions; said sheet having filament directionality values of XD/45° and MD/45° each less than 1.2 and greater than 0.4 wherein MD and XD are measures of the total filament lengths of the sheet in the machine and cross-machine directions respectively and 45° is the average of the measures of the total filament lengths of the sheet in the directions at 45° to the fabric length direction and wherein XD, MD and 45° are measures determined by the randometer method.

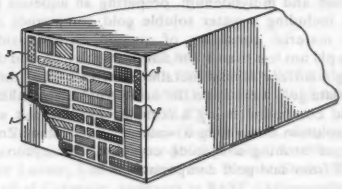
3,993,813
LIGHT TRANSMITTING WINDOW PANES

Gaetano C. R. Grieco, 6506 E. Sunnyside Drive, Scottsdale, Ariz. 85254; Joseph P. O. Grieco, 7748 E. Oak St., Scottsdale, Ariz. 85257, and Hugo R. A. Grieco, 2208 E. Missouri, Phoenix, Ariz. 85016

Continuation of Ser. No. 315,676, Dec. 15, 1972, abandoned. This application Sept. 27, 1974, Ser. No. 510,073

Int. Cl.² B44F *1/06*

U.S. Cl. 428—38 **1 Claim**



1. A series of light transmitting window panes having a plurality of non-identical pieces of light transmitting elements and formed from an elongated solid block, each said window pane of said series having a reproduced mosaic design, said window panes being produced by a process comprising the steps of:

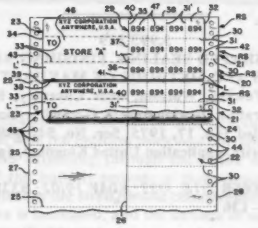
a. selecting a mold having cross-sectional dimensions approximating the height and width of said window panes;
b. placing a plurality of non-identical pieces of light transmitting material within the mold;
c. arranging said plurality of pieces to portray a cross-sectional mosaic pattern for said elongated solid block;
d. adding a curable binder intermediate adjacent ones of said plurality of pieces within the mold;
e. said piece arranging and binder adding steps effected on a piece-by-piece basis and methodical placement of a binder thereover to provide a built-up elongated block of material within the mold;
f. compacting the mold to eliminate voids adjacent said plurality of pieces and aid in circumscribingly distributing said binder about said plurality of pieces;
g. curing said binder to bind said plurality of pieces to one another and develop said elongated solid block;
h. cutting said elongated solid block with a plurality of cuts transversely along said elongated solid block to produce a commensurate plurality of slabs with opposed parallel faces, adjacent ones of said slabs having a reproduced mosaic design, each of said slabs defining an unfinished one of said window panes; and
i. working the opposed faces of each of said slabs to a predetermined finish; whereby, a reproduced mosaic design exists within said series of said window panes.

3,993,814

WEB OF RECORD ASSEMBLIES

Donald E. Cavender, Centerville, Ohio, assignor to Monarch Marking Systems, Inc., Dayton, Ohio

Filed Nov. 4, 1974, Ser. No. 520,710
Int. Cl.² G09F 3/10
U.S. Cl. 428—40 12 Claims



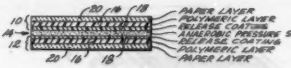
1. A web of record assemblies, comprising: a composite web having a longitudinally extending web of supporting material and printable label material having a coating of pressure sensitive adhesive releasably adhered to the supporting material, lines of partial severing in the supporting material web extending transversely across the entire width of the supporting material web at longitudinally spaced apart intervals to provide a plurality of record assemblies, a first line of complete severing in the supporting material web extending longitudinally between side edges of the supporting material web, a plurality of second lines of partial severing in the supporting material web between each pair of adjacent transverse lines of partial severing and extending transversely of the supporting material web at longitudinally spaced apart intervals, the second lines of partial severing extending between an edge of the supporting material web and the first line of complete severing, longitudinally spaced apart feed holes in opposite marginal side edges of the supporting material web adjacent the side edges, the label material of each record assembly being generally rectangular, a first line of partial severing in the label material extending longitudinally along generally the same line as the first line of complete severing in the supporting material web, and a plurality of second lines of at least partial severing in the label material extending transversely of the supporting material web along generally the same lines as the second lines of partial severing in the supporting material web, the second lines of partial severing in the supporting material web and the second lines of at least partial severing in the label material dividing the portions of the record assemblies on one side of the longitudinal first lines into at least three record sections, the supporting material on the other side of the first line of complete severing being readily removable, the record assemblies being separable from the web and the record sections of each separated record assembly being foldable upon each other and positionable under the portion of the label material on the other side of the first lines, the label material on the other side of the first line being free of any transverse line of complete severing extending from the first line to a side edge of the label material.

3,993,815

ANAEROBIC PRESSURE SENSITIVE ADHESIVE STOCKS

Maurice Douek, Los Angeles; Gustav A. Schmidt, South Pasadena, both of Calif.; Bernard M. Malofsky, Bloomfield, and Martin Hauser, West Hartford, both of Conn., assignors to Avery Products Corporation, San Marino, Calif. and Loctite Corporation, Newington, Conn.

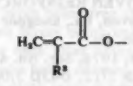
Filed Oct. 7, 1974, Ser. No. 512,940
Int. Cl.² B32B 27/26, 27/30
U.S. Cl. 428—40 28 Claims



1. An anaerobic pressure sensitive adhesive stock comprising:

a. a first release coating on a self-supporting adhesive stock comprising:

b. a transferable and curable pressure sensitive adhesive layer having one surface in contact with said first release coating, said pressure sensitive adhesive layer including a thermoplastic polymer system containing at least one thermoplastic polymer selected from the group consisting of polyvinyl chloride, polyvinyl ether, polyvinyl acetate, polyurethanes, polyesters, polyamids, acrylic polymers, natural elastomers, and synthetic elastomers; a curable anaerobic resin system comprising at least one anaerobic resin containing at least two polymerizable acrylic ester groups, each individually having the formula:



wherein R^2 is a radical selected from the group consisting of hydrogen, halogen and a lower alkyl containing from 1 to about 4 carbon atoms, said anaerobic resin system being present in an amount of from about 35 to about 95% by weight based on the total weight of the anaerobic resin system and the thermoplastic polymer system in the pressure sensitive adhesive layer and a catalyst system for curing said curable anaerobic resin system by activation of a provided peroxy initiator in the presence of an accelerator and upon the substantial exclusion of oxygen, the thermoplastic polymer system, anaerobic resin system and catalyst system in combination and in a substantially solvent free state forming the pressure sensitive adhesive layer having a static shear strength of at least 2 minutes at a 250 gram load per 0.25 square inch and a 180° peel value of at least about 0.5 lbs per inch prior to cure of said anaerobic resin system; and

c. a second release coating on a self-supporting release liner in contact with the opposed surface of said transferable pressure sensitive adhesive layer, the bond of the first release coating to the transferable pressure sensitive adhesive layer being less than the cohesive strength of said pressure sensitive adhesive layer and exceeding the bond of said second release coating for said pressure sensitive adhesive layer to permit the pressure sensitive adhesive layer including the thermoplastic polymer system, the anaerobic resin system, and the catalyst system to be preferentially separated from said second release coating for application and bonding to a substrate prior to separation of the pressure sensitive adhesive layer from said first release coating without cohesive failure of said pressure sensitive adhesive layer.

3,993,816

HOLLOW FIBER ASSEMBLY FOR USE IN FLUID TREATMENT APPARATUS

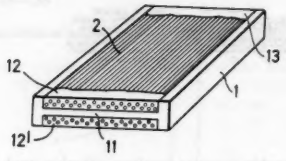
Jacques Baudet, Roussillon; Michel Rochet, Bron; Michel Salmon, Mions, and Bernard Vogt, Caluire, all of France, assignors to Rhone-Poulenc S.A., Paris, France

Filed July 10, 1974, Ser. No. 487,400

Claims priority, application France, July 11, 1973, 73.25450

Int. Cl.² B32B *3/02*, *5/02*; B01D *13/00*; F28F *3/08*

U.S. Cl. 428—45 19 Claims



1. A hollow fibre assembly for use in fluid treatment apparatus, said assembly comprising, in combination:

a. a primary frame having edges defining a central window;

b. a thinned down portion of at least two of said edges defining at least two hollows;

c. a mass of resin material in at least one of said hollows;

d. a web of hollow fibres extending between said hollows, with the ends of the hollow fibres embedded in said mass of resin material, open ends of said hollow fibres opening on a face of the mass.

3,993,817

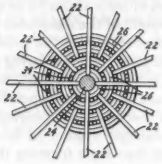
ORTHOGONALLY WOVEN REINFORCING STRUCTURE

Frederick E. Schultz, Devon, Pa., assignor to General Electric Company, Philadelphia, Pa.

Filed Jan. 4, 1974, Ser. No. 430,758

Int. Cl.² B32B *5/12*; D03D *3/00*, *25/00*

U.S. Cl. 428—64 3 Claims



1. A woven structure having an internal axis, and comprising threads of the three different classes: axial, radial and circumferential, in which:

a. axial threads extend in the direction of the internal axis;

b. radial threads lie partly substantially normal to said internal axis, extending in an interlocked, woven, relationship between various of said axial threads, and partly in said directions of said internal axis;

c. circumferential threads lie wrapped substantially normal to said internal axis, and in an interlocked, woven, relationship between and around said radial threads, and upon and beneath said axial threads, whereby said three classes of said threads comprising said woven structure are three mutually, substantially, orthogonal classes of threads, with each said class respectively lying substantially along a different normal axis.

3,993,818

RESIN BONDED COMPOSITE ARTICLES AND PROCESS FOR FABRICATION THEREOF

Richard Charles Novak, Glastonbury, and Roscoe Adams Pike, Simsbury, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Division of Ser. No. 446,890, Feb. 28, 1975, Pat. No. 3,915,781. This application June 2, 1975, Ser. No. 583,127

Int. Cl.² B32B *5/12*

U.S. Cl. 428—114 2 Claims

1. A composite article comprising a plurality of preconsolidated plies of continuous, parallel, high strength, high modulus filaments completely surrounded by a fully densified metal matrix material, said plies being bonded to one another by a layer of adhesive polymer between adjacent plies.

3,993,819

CHANNEL-SHAPED SEALING, FINISHING AND GUIDE STRIPS AND METHODS OF MAKING THEM

Graham H. Fewkes, Wolston, near Coventry, England, assignor to Draftex Development A.G., Switzerland

Filed Jan. 17, 1975, Ser. No. 542,088

Claims priority, application United Kingdom, Jan. 23, 1974, 3052/74

Int. Cl.² E06B *7/18*, *7/22*; E04F *19/02*; B32B *15/06*

U.S. Cl. 428—136 4 Claims

4. A flexible channel-shaped sealing, finishing or guide strip, comprising

a plurality of similar metallic U-form elements placed side-by-side and each having a base merging into two substantially straight and parallel legs,

a plurality of substantially straight connecting links each integral with and extending directly from a respective leg of one said element to the adjacent leg of the next element, each connecting link being substantially shorter than each leg of the elements and being slanted with respect to the direction of extension of the legs of the elements, and all the links being connected to the respective said legs with substantially the same flexibility, and

a covering of flexible resilient material over the elements and connecting links.

3,993,820

NON-WOVEN PRODUCT

Virginia L. Repke, Oak Forest, Ill., assignor to Johnson & Johnson, New Brunswick, N.J.

Continuation of Ser. No. 376,193, July 2, 1973, abandoned, which is a continuation-in-part of Ser. No. 187,472, Oct. 7, 1971, abandoned. This application July 1, 1975, Ser. No. 592,483

Int. Cl.² A61F *13/18*

U.S. Cl. 428—167 17 Claims

1. An absorbent fibrous structure having a length dimension greater than its width dimension and comprising: a highly porous, loosely compacted cellulosic fibrous batt having oppositely facing major surfaces; a paper-like, densified compacted cellulosic fibrous layer integral with said loosely compacted batt and extending continuously over substantially the entire area of one of the major surfaces thereof, said densified

layer being of substantially uniform thickness and merging with the loosely compacted portion of said batt at a generally planar interface; said densified layer including spaced, relatively narrow zones of densified compacted cellulosic fibers of greater thickness dimension than the uniform thickness portion of said densified layer and projecting beyond the interface between said loosely compacted batt and said densified layer, said zones being generally parallel with one another and extending lengthwise with respect to said structure, said zones being integral with the uniform thickness portion of said densified layer and extending through the entire cross-sectional thickness of the batt to provide a three-dimensional shear resistance whereby the strength and cohesiveness of the absorbent structure is increased; and the surface of said batt opposite to said densified layer being recessed inwardly toward said densified layer in the area of each of said zones to provide a cushioning effect.

3,993,821
METALLIZATION OF BERYLLIA COMPOSITES

Bruce R. Goss, Hixson, Tenn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Dec. 23, 1974, Ser. No. 535,566
Int. Cl.² B32B *3/00*; B05D *5/12*; C09D *11/00*; B32B *15/04*
U.S. Cl. 428—208 **6 Claims**

1. A silk-screening ink for metallizing high purity green beryllia substrates and cofiring therewith comprising the pigment combination in percents by weight of 95–70 percent finely divided molybdenum or tungsten and 5 to 30 percent finely divided high purity beryllia said combination being thoroughly dispersed in a vehicle conventional for silk-screening and constituting 70 to 90% by weight of said silk-screening ink.

4. A process for the production of a high purity beryllia substrate comprising the steps of

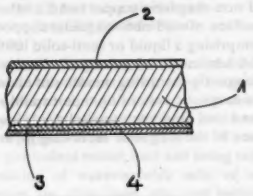
1. preparing a dispersion, in a vehicle conventional for silk-screening, of the combination of 5 to 30 percent by weight finely divided high purity beryllia and 95 to 70% of finely divided molybdenum or tungsten in an amount of 70 to 90% the total weight of the dispersion,
2. screening a desired metallized pattern of said dispersion on a green beryllia substrate consisting essentially of organic binder and high purity beryllia and thereafter
3. cofiring said pattern and said substrate in a reducing atmosphere to maturation at a temperature in the range of about 1500° to about 1660° C.

6. Metallized high purity beryllia composite for attachment of one or more electronic devices and dissipation of heat generated thereby, having a monolithic structure formed by laminating at least two green beryllia substrates comprising high purity beryllia and having metallizing patterns screened thereon composed of 5 to 30% by weight of finely divided high purity beryllia and 95 to 70% by weight of finely divided molybdenum or tungsten whereby a multilayer laminate is obtained and thereafter in a desired sequence separating individual composites from said laminate and firing said laminate or said individual composites to maturation in a reducing atmosphere at a temperature in the range of about 1500° to about 1660° C.

3,993,822
MULTI-LAYER PLASTERBOARD

Alfons Knauf, Siersburg; Karl Knauf, Iphofen; Franz Wirsching, Iphofen, Mfr.; Gerhard Neuhauser, Mainbernheim, and Herbert Altenhöfer, Iphofen, all of Germany, assignors to Gebr. Knauf Westdeutsche Gipswerke, Iphofen, Germany

Continuation of Ser. No. 117,983, Feb. 23, 1971, abandoned. This application Mar. 16, 1973, Ser. No. 341,955
Int. Cl.² B32B *7/02*, *17/02*
U.S. Cl. 428—213 **2 Claims**



1. A multi-layered gypsum board for construction purposes including a plate-like core of a soft, watery paste-like mixture of gypsum, water and fibers, the core having opposite major surfaces, one major surface being covered with a layer for preventing the penetration of plaster and the other major surface being covered with two layers, one layer being a cloth and the other layer being a material which is denser than the cloth of the one layer for preventing the penetration of gypsum, said two layers being adhesively bonded to each other for providing a composite deposited in a gypsum-free dry condition on the core, one of the two layers being embedded in the core and the other layer being free of gypsum, the thickness of the combined two layers being smaller than the thickness of the core and the core after being covered on the major surfaces with the layers being allowed to harden, the improvement being that the cloth layer is embedded in the core and is fiberglass while the material of the other layer which is denser than the cloth layer is a glassfiber fleece preventing the penetration of gypsum and on the outer surface of which plaster will favorably adhere.

3,993,823
LAMINAR ROLLER RINK SURFACE AND METHOD OF PRODUCING SAME

Barton B. Noll, Blue Springs, Mo., assignor to R. C. Sports, Inc., Olathe, Kans.

Filed Mar. 8, 1976, Ser. No. 664,949
Int. Cl.² B32B *3/28*
U.S. Cl. 428—213 **19 Claims**

1. A laminar floor construction, comprising:
a porous substrate;
a cured primer layer applied over said substrate and partially absorbed thereinto, said primer layer having a thickness of up to about 0.010 inches and including the dried residue of a first synthetic resin mixture which includes an epoxy resin and a curing agent therefor;
a cured resiliency layer applied over and bonded to said primer layer, said resiliency layer having a thickness of from about 0.030 to 0.500 inches and comprising the dried residue of a second synthetic resin mixture which includes an epoxy resin and a curing agent therefor, the concentration of solids in said second mixture being greater than that of said first mixture; and
a finishing layer applied over and bonded to said resiliency layer and including the dried residue of a third synthetic resin mixture which presents a floor surface.

3,993,824

RECORDING MEMBER COMPRISING A SUBSTRATE WITH A MAGNETIC LAGER ON ONE SURFACE AND A LUBRICATING LAGER ON THE OPPOSED SURFACE

Ryuji Shirahata; Yasuyuki Yamada, and Tatsuji Kitamoto, all of Odawara, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Feb. 18, 1975, Ser. No. 550,685
Claims priority, application Japan, Feb. 15, 1974, 49-18377
Int. Cl.² B32B 5/00, 27/18; G03G 5/10, 14/00
U.S. Cl. 428—216 10 Claims

1. A magnetic recording member comprising a non-magnetic support having a magnetic recording layer on one surface of said non-magnetic support and a lubricating layer on the other surface of said non-magnetic support, said lubricating layer comprising a liquid or semi-solid lubricant or a liquid or semi-solid lubricant and an organic binder.

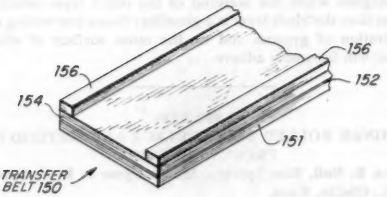
10. The magnetic recording member of claim 1 wherein said member is a magnetic recording tape capable of being wound into a roll and said liquid or semi-solid lubricant is transferred to the surface of the magnetic recording layer during winding operation.

3,993,825

ELECTROPHOTOGRAPHIC TONER TRANSFER AND FUSING APPARATUS AND METHOD

William R. Buchan, Lincoln, Mass., and Robert A. Moore, Amherst, N.H., assignors to Itek Corporation, Lexington, Mass.

Division of Ser. No. 403,696, Oct. 4, 1973, Pat. No. 3,893,761, which is a continuation-in-part of Ser. No. 303,168, Nov. 2, 1972, abandoned. This application Feb. 20, 1975, Ser. No. 551,460
Int. Cl.² B32B 7/02, 27/00, 9/04; B05B 5/02
U.S. Cl. 428—216 7 Claims



1. An intermediate toner transfer member comprising a substrate formed from the group consisting of a polyimide, a polyarylsulfone, a polyamideimide, and a high temperature nylon having an ultimate tensile strength of at least about 5,000 psi and a creep of below about 3% under a load of 1,000 psi at 175° C. and having thereon a smooth surface layer formed from a fluoroelastomer or a silicon rubber having a surface free energy of below about 40 dynes per centimeter and a hardness of from about 3 to about 70 durometers, said substrate having a thickness of between about 0.5 and about 5 mils and said surface layer having a thickness of from about 0.1 to about 10 mils.

3,993,826

PRESSURE-SENSITIVE ADHESIVE TAPE SUBSTRATE

Geoffrey Langford Butler, and Brian Gratton, both of Borehamwood, England, assignors to Adhesive Tapes Limited, Hertfordshire, England

Filed Jan. 14, 1975, Ser. No. 540,995
Claims priority, application United Kingdom, Jan. 18, 1974, 2527/74
Int. Cl.² B32B 27/32; C09J 7/02; C08L 53/02
U.S. Cl. 428—220 4 Claims

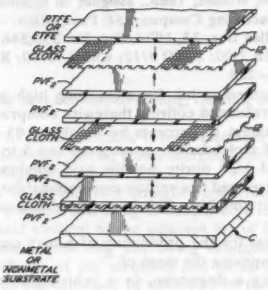
1. A pressure-sensitive adhesive tape substrate consisting essentially of an ethylene-propylene copolymer processing propylene units and ethylene units in weight ratios between 80:20 and 95:5 respectively together with a styrene-butadiene block copolymer thermoplastic elastomer in an amount below 30 parts by weight per hundred parts of polyolefin, said substrate being from 25 to 120 microns thick, having a tensile strength in the tape direction of at least 10 kg. per 25 mm. width of tape, and having been tensilized by monoaxial stretching in the tape direction.

3,993,827

PLASTIC LAMINATE CONSTRUCTION

Andrew A. Dukert, Ambler, and Alkis Christofas, Levittown, both of Pa., assignors to Pennwalt Corporation, Philadelphia, Pa.

Continuation-in-part of Ser. No. 348,577, April 6, 1973, abandoned, which is a continuation-in-part of Ser. No. 154,591, June 18, 1971, Pat. No. 3,779,854. This application Aug. 29, 1975, Ser. No. 609,123
Int. Cl.² B32B 27/06, 27/30
U.S. Cl. 428—251 17 Claims



1. A reinforced laminate construction having an outer ply comprising a flexible, porous, sheet-like matrix having the outer surface impregnated with a tetrafluoroethylene polymer resin applied from a liquid carrier to a depth not exceeding about one-half the thickness of said matrix, the under surface of said matrix being impregnated with a vinylidene fluoride polymer resin applied from a liquid carrier comprising a latent solvent for said resin to a depth defining at least a partial interface with said tetrafluoroethylene polymer resin in said matrix, and an inner ply comprising a sheet of a vinylidene fluoride polymer resin, the surface of said inner ply being in face-to-face adherent disposition with the surface of said vinylidene fluoride polymer resin of said outer ply, said tetrafluoroethylene polymer selected from the group consisting of homopolymer, and copolymers and terpolymers of at least 60 mol percent of tetrafluoroethylene with one or more comonomers selected from the group consisting of ethylene, vinylidene fluoride and hexafluoropropene, said vinylidene fluoride polymers selected from the group consisting of homopolymer and copolymers and terpolymers of at least 50 mol percent vinylidene fluoride with one or more comonomers selected

from the group consisting of ethylene, chlorinated ethylenes, fluorinated ethylenes and hexafluoropropene.

3,993,828

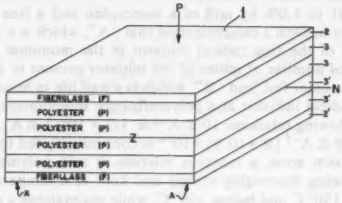
POLYESTER, FIBERGLASS-REINFORCED COMPOSITE LAMINATE

Clarence Curtis McCorsley, III, Asheville, N.C., assignor to Akzona Incorporated, Asheville, N.C.

Continuation of Ser. No. 333,187, Feb. 16, 1973, abandoned. This application Jan. 23, 1975, Ser. No. 543,305

Int. Cl.² B32B *15/00, 17/00*

U.S. Cl. 428—236 **22 Claims**



1. A fiber-reinforced polymeric resin composite laminate having improved impact strength and stiffness which comprises at least two adjacent reinforcing layers of a saturated polyester fiber arranged between at least two reinforcing layers of fiberglass fiber and bonded together by a synthetic resin, said laminate having a thickness sufficient to provide said improved impact strength and stiffness and the ratio of polyester fiber to fiberglass fiber, on a volume-to-volume basis ranging from 1 : 1 to 20 : 1.

3,993,829

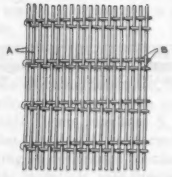
PRODUCTION OF PERVIOUS LOW DENSITY CARBON FIBER REINFORCED COMPOSITE ARTICLES

Im Keun Park, Summit, N.J., assignor to Celanese Corporation, New York, N.Y.

Division of Ser. No. 347,594, April 3, 1973, Pat. No. 3,859,158, which is a division of Ser. No. 135,698, April 20, 1971, Pat. No. 3,779,789. This application July 31, 1974, Ser. No. 493,632

Int. Cl.² C09J *5/02*

U.S. Cl. 428—255 **7 Claims**



1. A carbon tape of an open weave construction suitable for use as a fibrous reinforcing medium in a pervious low density composite article when impregnated with a thermosetting resinous matrix material comprising a plurality of adjacent substantially parallel and spaced linear warp ends of a carbonaceous fibrous material containing at least 90 percent carbon by weight substantially coextensive with the length of said tape wherein no substantial lateral contact is made between said adjacent warp ends, and a fibrous weft pick containing at least 90 percent carbon by weight interlaced with said warp ends in a plain weave construction at a frequency of about 2 to 8 picks per inch of said tape with said weft pick being provided under a tension sufficient that said linear configuration of said warp ends is substantially unimpaired.

3,993,830

SOIL-RELEASE FINISH

Robert E. Dickson, Belle Mead, N.J., and Stanley M. Barkin, Pittsburgh, Pa., assignors to Colgate-Palmolive Company, New York, N.Y.

Continuation-in-part of Ser. No. 248,658, April 28, 1972, Pat. No. 3,798,169. This application Oct. 23, 1973, Ser. No. 408,480

The portion of the term of this patent subsequent to Mar. 19, 1992, has been disclaimed.

Int. Cl.² D06M *15/14*

U.S. Cl. 428—290 **19 Claims**

1. A composition for imparting non-permanent soil-release characteristics to textile fabrics comprising a copolymer of an ethylenically unsaturated monocarboxylic monomer and a lower alkyl acrylate or methacrylate, said polymer having an acid equivalent weight of from about 110 to 175 and a water-soluble salt of a polyvalent metal, said salt being selected from the group consisting of water-soluble salts of magnesium, calcium, zirconium, tin, aluminum, zinc and barium.

3,993,831

MICROCAPSULES, PROCESS FOR THEIR FORMATION AND TRANSFER SHEET RECORD MATERIAL COATED THEREWITH

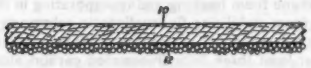
Anthony E. Vassiliades, Deerfield, Ill., assignor to Champion International Corporation, Stamford, Conn.

Continuation-in-part of Ser. No. 784,459, Dec. 17, 1968, abandoned, which is a continuation-in-part of Ser. No. 503,391, Oct. 23, 1965, Pat. No. 3,418,656. This application Apr. 8, 1971, Ser. No. 132,496

The portion of the term of this patent subsequent to Dec. 24, 1985, has been disclaimed.

Int. Cl.² B41M *5/00;* **B01J** *13/02*

U.S. Cl. 428—307 **19 Claims**



1. A process for the formation of microcapsules in the absence of coacervation, the capsule walls of which comprise an essentially impermeable precipitate of a hydrophobic, partially condensed, thermosetting resin, said microcapsules containing minute droplets of an oily material, said process comprising admixing:

A. a partially condensed, formaldehyde condensation product in an aqueous medium, said condensation product being capable of being separated from the aqueous medium in solid particle form as a precipitate, upon dilution with water; and

B. an oil-in-water emulsion comprising a water-immiscible oily material selected from the group consisting of liquid and low melting oils, fats, and waxes, as the disperse phase and an aqueous, colloidal solution of an amphiphilic emulsifying agent as the dispersion medium, the water of said emulsion being present in a quantity sufficient to cause the separation of said condensation product from the aqueous medium,

said admixing causing said condensation product to separate from the aqueous medium in solid particle form as a precipitate about a nucleus of oil-in-water upon dilution with the water of the emulsion, which diluution takes place slowly and under conditions of brisk agitation.

4. A process as defined in claim 1 wherein said oil-in-water emulsion is admixed with a solid suspension of a partially condensed, formaldehyde condensation product in water.

5. A process as defined in claim 4 wherein said condensation product is a B-stage urea-formaldehyde condensation product.

6. A process as defined in claim 5 wherein said oily material contains a colorless dye intermediate.

7. A pressure-sensitive transfer sheet record material for use in a transfer-copy system having on one side thereof a coating of microcapsules made according to the process of claim 6.

3,993,832
PRESSURE-SENSITIVE TRANSFER ELEMENT AND PROCESS

Douglas A. Newman, Glen Cove, N.Y., assignor to Columbia Ribbon and Carbon Manufacturing Co., Inc., Glen Cove, N.Y.

Filed Oct. 31, 1975, Ser. No. 627,619
Int. Cl.² B32B *3/26, 5/18*
U.S. Cl. 428—307 **10 Claims**

1. A pressure-sensitive transfer element comprising a microporous network of synthetic thermoplastic resin containing within the pores thereof a pressure-exudable fluid ink comprising a polymerizable resin-forming binder material and coloring matter, said ink being pressure-transferable to a copy sheet in the form of a fluid ink capable of being polymerized and solidified by subjecting it to polymerization conditions.

5. A transfer element according to claim 1 in which said microporous network is in the form of a thin layer supported by a flexible foundation to provide a pressure-sensitive image-forming transfer element.

3,993,833
POLYURETHANE FOAM-BACKED PRESSURE-SENSITIVE ADHESIVE TAPE

Donald L. Esmay, Coon Rapids, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Jan. 19, 1976, Ser. No. 650,149
Int. Cl.² B32B *3/26*
U.S. Cl. 428—311 **14 Claims**

1. Pressure-sensitive adhesive tape having an open-cell polyurethane foam backing and incorporating in the polyurethane a foam-stabilizing fluoroaliphatic substance containing covalently bonded (a) a plurality of fluoroaliphatic radicals having at least three fully fluorinated carbon atoms, one of which is terminal, and (b) at least one moiety similar in structure to a moiety of the polyurethane, said solubilizing moieties providing 5 to 40 weight percent and carbon-bonded fluorine providing 10 to 45 weight percent of the fluoroaliphatic substance, the fluoroaliphatic substance being free of functional groups containing active hydrogen atoms and being present in an amount affording repellency to gasoline.

3,993,834
LIGHT TRANSMITTING FILAMENT

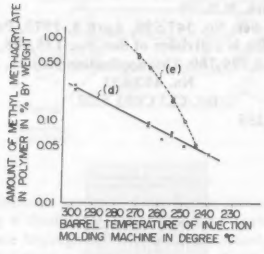
Kazuya Chimura, Otake; Takashi Kaneko, Tokyo; Shunichi Takashima, Otake; Ryuichi Nakazono, Otake; Masao Kawashima, Otake; Hiroyuki Ota, Otake; Kenji Tamura, Otake; Kazunori Kagawa, Otake; Kazushi Shimada, Otake; Toru Maeda, Otake; Hisao Anzai, Otake; Kenji Takoi, Otake, and Kenichi Sakunaga, Otake, all of Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan

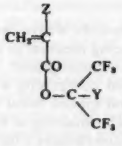
Filed Nov. 22, 1974, Ser. No. 526,383
Claims priority, application Japan, Nov. 22, 1973, 48-131390
Int. Cl.² D02G *3/00;* **B32B** *27/00*
U.S. Cl. 428—373 **11 Claims**

1. A sheath-core composite filament having improved light transmission and having an absorption co-efficient(k) of $1.0 \times 10^{-3}cm^{-1}$ to $2.8 \times 10^{-3}cm^{-1}$ at a filament core diameter of 0.5 mm, formed of a core material consisting of a methyl methacrylate polymer containing at least 80% by weight of units derived from methyl methacrylate and a sheath material consisting of a fluorine-containing polymer, containing at least 30% by weight of fluorine and having a refractive index of at most 1.42 characterized in that said sheath-core composite filament is formed by the procedure wherein the methyl methacrylate polymer and the fluorine-containing polymer are melt-extruded in a way such that the methyl methacrylate polymer is concentrically surrounded by the fluorine-containing polymer and then, the obtained sheath-core composite filament is drawn 1.3 2.5 times its original length or the procedure wherein the methyl methacrylate polymer is melt-extruded into a filament and the filament is drawn 1.3 to 2.5 times its original length and thereafter coated with the fluorine-containing polymer, and said methyl methacrylate polymer is prepared by the procedure of continuous bulk polymerization at a relatively high temperature and subsequent removal of volatile contents, wherein a monomer feed, containing 0.01 to 1.0% by mol of a mercaptan and a free radical initiator in such a concentration that "A", which is a concentration of the free radical initiator in the monomer feed in terms of number of moles of the initiator present in 100 g of the monomer fed, and "B", which is a half life in hours of the free radical initiator at a polymerization temperature, satisfy the following relations: $10 \geqq A^{1/2}.B^{-1}/2 \times 10^3$, $3 \geqq A \,.\, B \times 10^5$ and $2.9 \geqq A^{-1}\,(B+10.3) \times 10^{-6}$ is continuously fed to a polymerization zone, a reaction mixture in said polymerization zone being thoroughly stirred and kept at a temperature of above 130° C and below 160° C, while maintaining a polymer content ϕ (in % by weight) in said reaction mixture substantially constant and so as to satisfy the following relation:

$$50<\phi<70 \exp(0.0121T - 1.81)$$

wherein T represents the polymerization temperature in °C, thereby effecting polymerization, continuously withdrawing the reaction mixture from the polymerization zone and finally continuously removing volatile contents mainly composed of unreacted monomers; and said fluorine-containing polymer being at least one polymer selected from the group consisting of poly-2,2,2-trifluoroethyl methacrylate, a homopolymer or copolymer of a compound having the structure





wherein Z is CH_3 or H and Y is CF_3 or H, a homopolymer or copolymer of 2,2,3,4,4,4-hexafluorobutyl methacrylate and a copolymer of 60 to 80 mole % of vinylidene fluoride and 20 to 40 mole % of tetrafluoroethylene.

3,993,835

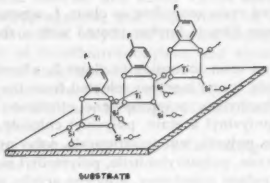
TRANSITION METAL OXIDE COMPLEX COUPLING AGENTS COATED ON SILICEOUS SUBSTRATES

Patrick M. Miedaner, Aspinwall, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Continuation of Ser. No. 208,238, Dec. 15, 1971, abandoned, which is a continuation of Ser. No. 836,889, June 26, 1969, abandoned. This application Dec. 4, 1973, Ser. No. 421,705

Int. Cl.² B32B 17/02, 17/06; C07F 7/28, 11/00

U.S. Cl. 428—378 20 Claims



1. An article of manufacture which comprises a siliceous substrate coated with a hydrolytically stable coordination compound of a transition metal oxide with an ortho-functional monocyclic aromatic compound in which the ortho substituents have unshared electrons in a 1:1 complex with the transition metal atom, said transition metal atom bonding by means of an oxygen atom to the other transition metal atoms on the surface of the siliceous substrate, the ortho-functional aromatic compound containing an additional functional organic group which is reactive with organic materials, said functional organic group selected from the class consisting of amine, imine, polyamine, polyimine, chloro-containing, thio-containing, olefinic-containing, epoxy-containing, or hydroxyl-containing and the ortho-functional aromatic compound when complexed with the metal oxide forms resultant 5, 6 or 7 membered rings.

13. A method of coating a siliceous substrate having a film of a transition metal oxide thereon comprising:

a. complexing on the surface of said siliceous substrate the said film of a transition metal oxide with an ortho-functional monocyclic aromatic compound in which the ortho substituents have unshared electrons to form a 1:1 complex, and

b. heating the complexed substrate to render the complex hydrolytically stable, thus forming a coating on said siliceous substrate,

the 1:1 complex permitting the transition metal atom to bond by means of an oxygen atom to other transition metal atoms on the surface of the siliceous substrate, the ortho-functional monocyclic aromatic compound when complexed with the transition metal oxide forms resultant 5, 6 or 7 membered rings and the ortho-functional monocyclic aromatic compound also containing an additional functional group which is reactive with organic materials, said functional organic group selected from the class consisting of amine, imine, polyamine, polyimine, chloro-containing, thio-containing, olefinic-containing, epoxy-containing or hydroxyl-containing.

18. A method of coating a siliceous substrate having a film of a transition metal oxide thereon consisting of:

a. complexing at the surface of said siliceous substrate the said film of a transition metal oxide with an ortho-functional phenolic or resorcinolic resin in which the ortho substituents have unshared electrons to form a 1:1 complex, and

b. heating the complexed substrate to render the complex hydrolytically stable, thus forming a coating on said siliceous substrate,

the 1:1 complex permitting the transition metal atom to bond by means of an oxygen atom to other transition metal atoms on the surface of the siliceous substrate, and the ortho-functional phenolic or resorcinolic resin when complexed with the transition metal oxide forms resultant 5, 6 or 7 membered rings.

3,993,836

BONDING OF RUBBER TO REINFORCING ELEMENTS

Heimo J. Langer, Columbus, Ohio, and William J. McKillip, Crystal Lake, Ill., assignors to Ashland Oil, Inc., Ashland, Ky.

Filed Mar. 26, 1975, Ser. No. 562,261

Int. Cl.² B32B 15/02, 15/08

U.S. Cl. 428—383 4 Claims

1. A rubber-reinforcing element in the form of a filamentary substrate of steel having a heat-cured first coating of an addition polymerization product consisting essentially of a copolymer of 4-vinylpyridine and an aminimide selected from the group consisting of dimethyl-(2-hydroxypropyl)amine methacrylimide and trimethyl amine methacrylimide, and a heat-cured second coating of a RFL adhesive.

3,993,837

COMPLEX ORGANO SILICON COMPOUNDS

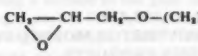
Kevin M. Foley, Hebron, and Francesco M. Vigo, Heath, both of Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Continuation-in-part of Ser. No. 347,264, April 2, 1973, Pat. No. 3,899,524, and a continuation-in-part of Ser. No. 347,241, April 2, 1973, Pat. No. 3,931,266. This application Apr. 4, 1975, Ser. No. 565,169

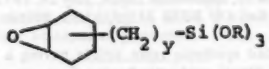
Int. Cl.² B32B 9/00

U.S. Cl. 428—391 32 Claims

1. Glass fibers having a thin size coating thereon, said coating comprising an organo silane selected from the group consisting of a compound having the formula



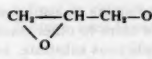
and a compound having the formula



wherein x is an integer from 3 to 6, y is an integer from 2 to 4 and R is alkyl and the hydrolysis products thereof, and an organo silicon compound prepared by reaction of (1) a halosilane selected from the group consisting of a tetrahalosilane and a halosilane of the formula

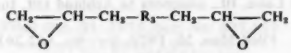
$(R_7)_nSiX_{4-n}$

wherein R_7 is an organic group containing 1 to 20 carbon atoms, n is an integer from 1 to 2 and X is halogen, (2) a monoepoxide selected from the group consisting of an alkylene oxide, a functional epoxide having the formula



wherein R_2 is selected from the group consisting of aryl, alkyl, alkenyl and a group having the formula

where R′ is hydrogen or methyl, and combinations thereof, and (3) a diepoxide selected from the group consisting of an epoxide of the formula



wherein R_3 is a divalent organic group and a cycloalkane diepoxide, with (2) being reacted in a ratio of 1 to 3 epoxide equivalents per mole of (1) and (3) being reacted in a ratio of 0.5 to 3 epoxide equivalents per mole of (1).

3,993,838

WAX OR PLASTIC COATED PHOSPHOR GRAINS

Herman R. Heytmeijer, Whippany, and Elmer S. Panaccione, N. Arlington, both of N.J., assignors to The United States of America as represented by the Secretary of the Interior, Washington, D.C.

Filed Mar. 3, 1975, Ser. No. 554,838
Int. Cl.² B32B *5/16*
U.S. Cl. 428—403 **4 Claims**

1. A coated phosphor grain adapted for incorporation in an explosive material to serve as a tagging agent and to furnish information thereon;

said coating having a melting point of at least 70° C and consisting essentially of low molecular weight polyethylene and an antistatic agent.

3,993,839

PRINTABILITY IMPROVERS FOR MOLDED SYNTHETIC RESIN PRODUCTS

Yasuhiko Sato, and Akitoshi Komiya, both of Annaka, Japan, assignors to Shinetsu Chemical Company, Tokyo, Japan

Continuation of Ser. No. 381,032, July 20, 1973, abandoned. This application Jan. 15, 1975, Ser. No. 541,090
Claims priority, application Japan, July 24, 1972, 47-73948
Int. Cl.² B32B *25/20, 27/32, 27/38*
U.S. Cl. 428—413 **11 Claims**

1. A molded synthetic resin article having a layer of an organosiloxy titanic acid ester having the average formula

$$(R^1O)_{4-n}Ti\,(OSiR^2R^3R^4)_n$$

where R^1 is a monovalent hydrocarbon radical having from 1 to 18 carbon atoms; R^2, R^3 and R^4 are the same or different monovalent organic radicals selected from the group consisting of monovalent hydrocarbon radicals having from 1 to 6 carbon atoms and organosiloxy radicals having the average formula

$$(R^5)_aSiO_{4-a/2}$$

where R^5 is the same or different monovalent organic radicals selected from the group consisting of hydrocarbon and alkoxy radicals having from 1 to 6 carbon atoms and a is a positive number of from 1.5 to 3; and n is a number of from 0.3 to 3.2.

3,993,840

MOLDED PULLULAN TYPE RESINS COATED WITH THERMOSETTING RESIN FILMS

Kozo Tsuji; Nobuhiro Toyota, and Fumio Fujita, all of Osaka, Japan, assignors to Sumitomo Chemical Company, Limited, Osaka and Hayashibara Biochemical Laboratories, Incorporated, both of Japan

Filed June 16, 1975, Ser. No. 587,164
Claims priority, application Japan, June 29, 1974, 49-74830
Int. Cl.² B32B *9/02, 9/04*
U.S. Cl. 428—413 **6 Claims**

1. A molded pullulan type resin coated with a thermosetting resin film selected from the group consisting of polyurethane and epoxy resin.

2. A molded resin according to claim **1**, wherein the thermosetting resin film is further coated with a thermoplastic resin.

3. A molded resin according to claim **2**, wherein the thermoplastic resin is one member selected from the group consisting of polyethylene, polypropylene, ethylene-vinyl acetate copolymer, polyvinyl acetate, polyvinyl chloride, polyvinylidene chloride, polyethylene tetrafluoride, polyvinylidene fluoride, polystyrene, polyacrylonitrile, polymethyl methacrylate, ethylene-propylene copolymer, ethylene-acrylic acid copolymer, salts of said polymer, ethylene-methyl acrylate copolymer, propylene-vinyl chloride copolymer, ethylene-vinyl alcohol copolymer, polyethylene terephthalate, polybutylene terephthalate, polycarbonate, nylon, polyoxymethylene, polysulfone, polyphenylene oxide, polyether sulfone and polyphenylene sulfide.

3,993,841

STEEL PLATE COATED WITH THERMOSETTING PHENOL RESIN AND BISPHENOL A TYPE EPOXY RESIN

Takashi Matsubara; Yûkô Takeuchi, and Toshiro Hirose, all of Nagoya, Japan, assignors to Toagosei Chemical Industry Co., Ltd., Tokyo, Japan

Filed Feb. 10, 1975, Ser. No. 548,840
Claims priority, application Japan, Feb. 8, 1974, 49-15364; Feb. 8, 1974, 49-15365
Int. Cl.² B32B *15/08, 15/18*
U.S. Cl. 428—418 **11 Claims**

1. A coated steel plate suitable for bonding with a polyamide adhesive comprising a steel plate having coated thereon

a. a composition comprising a thermosetting phenol resin and a bisphenol A type epoxy resin, the thermosetting phenol resin comprising the condensation product obtained on reacting under reflexing a phenol and formaldehyde in less than one mol per equivalent of the phenolic hydroxyl group in the presence of an alkali catalyst;

b. a composition comprising a thermosetting phenol resin and a bisphenol A type epoxy resin, the thermosetting phenol resin comprising the condensation product obtained by washing with water the condensation product obtained by reacting under refluxing a phenol and formaldehyde in less than one mol per equivalent of the phenolic hydroxyl group in the presence of an alkali catalyst and then heating the condensation product to a temperature above about 60° C;

c. a composition comprising a thermosetting phenol resin and a bisphenol A type epoxy resin, the thermosetting phenol resin comprising the condensation product obtained by washing with water a condensation product obtained by reacting a phenol and formaldehyde in an amount more than about one mol per equivalent of the phenolic hydroxyl group under refluxing in the presence of an alkali catalyst and then heating the condensation product to a temperature higher than about 60° C with the addition of a phenol in an amount such that the total amount of the phenolic hydroxyl group is greater than one equivalent per mol of formaldehyde; or

d. a mixture thereof.

3,993,842

ELECTRICALLY CONDUCTIVE ELASTOMERIC INK

Albert Edgar Hirsch, Wilmington, Del., and Henry Joseph Stinger, Devon, Pa., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 353,967, April 24, 1973, abandoned. This application Mar. 18, 1974, Ser. No. 451,983

Int. Cl.² C09D 5/24, 11/00, 11/10

U.S. Cl. 428—421 7 Claims

1. An elastomeric ink composition having good storage stability which comprises

A. 100 parts by weight of a fluoroelastomer, in solution in component (B), said fluoroelastomer being selected from the group: copolymers of about 50–85 mole percent of vinylidene fluoride and about 15–50 mole percent of hexafluoropropylene, and copolymers of about 30–80 mole percent of vinylidene fluoride, about 15–40 mole percent of hexafluoropropylene and about 5–30 mole percent of tetrafluoroethylene,

B. an organic solvent for component (A), and

C. about 10–100 parts by weight of electrically conductive carbon black,

said ink being substantially free of crosslinking agents for the fluoroelastomer.

3,993,843

AQUEOUS DISPERSION OF AROMATIC POLYSULFONE RESIN WITH PERFLUOROCARBON RESIN, AND COATED ARTICLES

Joseph A. Vasta, Woodbury, N.J., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

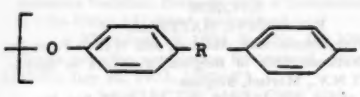
Continuation of Ser. No. 340,844, March 13, 1973, abandoned. This application Apr. 1, 1975, Ser. No. 564,215

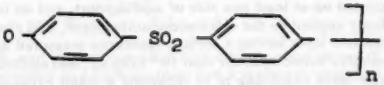
Int. Cl.² C08L 27/18, 81/06

U.S. Cl. 428—422 7 Claims

1. An aqueous dispersion comprising 10–60% by weight of a film-forming binder dispersed in 37–89.9% by weight of water, wherein the dispersed binder particles have a particle size of about 0.02–0.5 microns and are dispersed by about 0.1–3% by weight of a surfactant; and the binder consists essentially of

1. 75–98% by weight, based on the weight of the binder, of a polysulfone resin of the formula





where *n* is from 50–120 and R is an alkylene group of 1–6 carbon atoms, and

2. 2–25% by weight, based on the weight of the binder, of a perfluorocarbon resin.

3,993,844

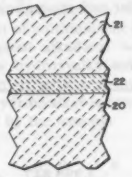
COMPOSITE CERAMIC ARTICLES AND METHOD OF MAKING

William T. Kiger, San Mateo County, Calif.; George J. Kamin, deceased, late of Towanda, Pa., by Shirley A. Kamin, administratrix, Wellsboro, Pa., assignors to GTE Sylvania Incorporated, Stamford, Conn.

Filed Dec. 30, 1974, Ser. No. 537,179

Int. Cl.² B32B 9/04; C04B 35/18, 35/50

U.S. Cl. 428—428 3 Claims



1. A composite structure comprising at least two ceramic bodies, each body selected from the group consisting of rare earth based, alumina based, and silica based ceramic compositions, said bodies having at least a portion of their respective surfaces joined by a eutectic composition of alumina, silica and rare earth oxide wherein the eutectic composition consists essentially of, in weight percent, 11–33 percent alumina, 25 to 59 percent silica, and 22 to 53 percent of said rare earth oxide.

3,993,845

THIN FILMS CONTAINING METALLIC COPPER AND SILVER BY REPLACEMENT WITHOUT SUBSEQUENT ACCELERATED OXIDATION

Charles B. Greenberg, Murrysville, and Peter P. Harmon, North Huntington, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Continuation-in-part of Ser. No. 384,763, July 30, 1973, Pat. No. 3,920,864. This application Apr. 17, 1975, Ser. No. 569,334

Int. Cl.² B32B 15/04, 15/08; B05D 1/36

U.S. Cl. 428—433 17 Claims

9. A method of preparing a coated glass sheet comprising the steps of:

a. sensitizing a surface of the glass sheet;

b. applying a copper film to the sensitized surface; and

c. contacting the copper film with an aqueous solution comprising water, an ammoniacal silver salt and a complexing agent selected from the group consisting of ethylenediamine, disodium ethylenediamine tetraacetate, tetrasodium ethylenediamine tetraacetate, ethylenediamine mono-d-tartrate, sodium oxalate and ammonium hydroxide.

15. The method according to claim 9 wherein the glass sheet is a clear, transparent glass sheet.

3,993,846

MAGNETIC RECORDING MEDIUM

Shigetaka Higuchi; Yoshiaki Hisagen, both of Sendai; Tetsuya Mayuzumi, Higashi-kurume, and Masatoshi Tokita, Annaka, all of Japan, assignors to Sony Corporation, Tokyo, Japan

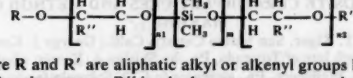
Filed July 17, 1974, Ser. No. 489,241

Claims priority, application Japan, July 21, 1973, 48-80824

Int. Cl.² H01F 10/02

U.S. Cl. 428—447 5 Claims

1. A magnetic recording medium consisting of a base of non-magnetic material and a magnetic layer containing finely divided magnetic particles dispersed in a binder, said magnetic layer including an organosilicic compound having the formula:



where R and R′ are aliphatic alkyl or alkenyl groups having 8 to 18 carbon atoms, R″ is a hydrogen atom or a methyl group, *m* is an integer in the range from 1 to 15, and n_1 plus n_2 is an integer in the range from 2 to 16, 3 to 10 parts of said organosilicic compound are included for every 100 parts by weight of magnetic material in said magnetic layer and said organosilicic compound providing substantially the entire lubricating function for said magnetic recording medium.

3,993,847
SILICA IN ADHESIVE

Eiji Kondo, Toba Akashi, Japan, assignor to Honny Chemicals Company, Ltd., Kobe, Japan

Filed Aug. 26, 1975, Ser. No. 607,944
Claims priority, application Japan, Sept. 14, 1974, 49-106503; Sept. 14, 1974, 49-106504
Int. Cl.² B32B *15/06, 25/02*
U.S. Cl. 428—451 **28 Claims**

1. In a process of bonding a rubber to a ferrous metal substrate wherein an adhesive is applied to said metal substrate and the rubber is contacted therewith and bonded by heat and pressure, the improvement comprising using as said adhesive an interpolymer comprising about 40–99 percent by weight of a conjugated diene, about 1–20 percent by weight of a heterocyclic nitrogen base and 0 to about 40 percent by weight of at least one additional copolymerizable monomer, said adhesive containing about 5–180 parts of a high purity silica filler per 100 parts of said interpolymer.

13. A laminated article comprising a ferrous metal substrate having bonded thereto a rubber by means of an adhesive layer, said adhesive being an interpolymer comprising about 40–99 percent by weight of a conjugated diene, about 1–20 percent by weight of a heterocyclic nitrogen base and 0 to about 40 percent by weight of at least one additional copolymerizable monomer, and said adhesive containing about 5–180 parts of a high purity silica filler per 100 parts of said interpolymer on an anhydrous weight basis.

3,993,848
CATALYTIC PRIMER

Nathan Feldstein, Kendall Park, N.J., assignor to Surface Technology, Inc., Princeton, N.J.

Filed Feb. 18, 1975, Ser. No. 550,435
Int. Cl.² C23C *3/02*
U.S. Cl. 428—457 **9 Claims**

1. An improved process for preparing a non-metallic substrate for electroless plating comprising:

A. Treating the substrate with a linking agent capable of providing sites for stannous ion adsorption on said substrate without cleaning in a manner which would cause removal of said linking agent;

B. Priming said substrate with stannous and copper ions from a composition in which the ratio of stannous to cuprous ions is at least 1:1; and

C. Reducing the valence state of said copper ions to their metallic state.

3,993,849
METAL SUBSTRATE COATED WITH A THERMOSETTING POWDER COATING COMPOSITION OF AN ACRYLIC POLYMER, A HYDROXY FUNCTIONAL PLASTICIZER AND A BLOCKED POLYISOCYANATE CROSS-LINKING AGENT

Claus Victorius, Media, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Dec. 24, 1974, Ser. No. 536,320
Int. Cl.² B32B *15/08, 27/22, 27/30*
U.S. Cl. 428—463 **9 Claims**

1. A metal substrate coated with a smooth, even coalesced layer of a thermosetting polymer powder coating composition comprising a blend of constituents consisting essentially of about

A. 40–75% by weight of at least one acrylic polymer consisting essentially of about

1. 80–95% by weight of methyl methacrylate, styrene or a mixture of methyl methacrylate and styrene;
2. 0–10% by weight of an alkyl methacrylate or an alkyl acrylate having 2–14 carbon atoms in the alkyl groups;
3. 5–20% by weight of a hydroxy alkyl methacrylate, a hydroxy alkyl acrylate each having 2–4 carbon atoms in the alkyl groups or a mixture of said hydroxy alkyl methacrylate and said hydroxy alkyl acrylate; and

wherein the acrylic polymer has a weight average molecular weight of about 5,000–20,000, a glass transition temperature of 75°–103°C. and a hydroxyl content of 0.5–3% by weight, based on the weight of the acrylic polymer;

B. 10–30% by weight of a hydroxy functional polyester plasticizer having a hydroxyl number of about 18–300 and a number average molecular weight of about 500–6,000 or a mixture of these hydroxy functional polyester plasticizers; wherein these functional plasticizers are polyesters of an alkylene glycol or mixtures of alkylene glycols and an aliphatic, alicyclic or aromatic dicarboxylic acid or a mixture of these acids;

C. 15–30% by weight of a blocked polyisocyanate of an aliphatic polyisocyanate or a cycloaliphatic polyisocyanate blocked with an organic blocking agent; wherein the blocked polyisocyanate is stable below 50°C and breaks down under moderate baking conditions to provide reactive isocyanate groups; and

D. a catalytic amount of an organo metallic compound;

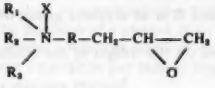
wherein the molar ratio of NCO/OH for all of the above constituents is about 0.9/1 to about 1:3/1.

3,993,850
RECORDING MATERIAL

Daniel Maurice Timmerman, Mortsel, and Walter Frans De Winter, Berchem, both of Belgium, assignors to AGFA-GEVAERT N.V., Mortsel, Belgium

Division of Ser. No. 323,420, Jan. 15, 1973, Pat. No. 3,864,158. This application Jan. 3, 1975, Ser. No. 538,261
Claims priority, application United Kingdom, Jan. 17, 1972, 2134/72
Int. Cl.² B32B *27/10*
U.S. Cl. 428—474 **4 Claims**

1. An electrographic recording material comprising a support of paper or synthetic polymer, an electroconductive layer coated on at least one side of said support, and an insulating layer applied to the electroconductive layer, said electroconductive layer having a surface resistance measured at 15% of relative humidity lower than 10^{11} ohm/sq., said electroconductive layer consisting of or including a major proportion of a water-soluble polymer resulting from the amino-alkylation of polyethyleneimine with an epoxy compound bearing a quaternary ammonium end group, according to the general formula:



wherein:

R represents a branched or unbranched alkylene group having up to 4 carbon atoms,

each of R_1, R_2, and R_3 (same or different) represents an alkyl group containing up to 4 carbon atoms, a cycloalkyl group or an aralkyl group,

or wherein R_1, R_2, and R_3 together with the nitrogen atom represent a heterocyclic amine group, and

X is an anion.

3,993,851
NOVOLAK-TYPE RESINS AND VARNISHES

Joseph Gordon Robinson, Winchcombe, and Sally Ann Brain, Tewkesbury, both of England, assignors to Coal Industry (Patents) Limited, London, England

Filed Apr. 30, 1975, Ser. No. 573,116

Claims priority, application United Kingdom, May 10, 1974, 20904/74

Int. Cl.² B32B 9/04; C08G 8/08

U.S. Cl. 428—531 **7 Claims**

1. A laminating varnish comprising an alcohol-soluble novolak-type resin of softening point not less than about 60° C., which resin is produced by reacting toluene with formaldehyde or a formaldehyde donor, in a molar ratio of toluene: formaldehyde of 1:2.5 to 4, in the presence of 30 to 65% w/w sulphuric acid to form a toluene-formaldehyde resin having an oxygen content within the range 4 to 18% by weight, and a molecular weight of from about 250 to about 500, reacting said toluene-formaldehyde resin with phenol in an amount of 0.7 to 2.0 parts by weight per part by weight of said toluene-formaldehyde resin to obtain an alcohol-soluble novolak-type resin product and treating said product with hexamine to raise its softening temperature to not less than about 60° C., a varnish solvent and a further proportion of hexamine.

3,993,852
PROCESS FOR FLAMEPROOFING ORGANIC FIBER MATERIALS BY THE TRANSFER PROCESS

Fritz Mayer, Haltingen, Germany; Jörg Kern, Oberwil, and Hermann Nachbur, Dornach, both of Switzerland, assignors to Ciba-Geigy AG, Basel, Switzerland

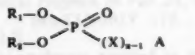
Filed June 18, 1974, Ser. No. 480,339

Claims priority, application Switzerland, June 22, 1973, 9187/73; July 26, 1973, 10926/73

Int. Cl.² C23C 11/00; C09K 3/28

U.S. Cl. 428—921 **11 Claims**

1. Process for flameproofing organic fiber material by the dry thermal transfer process which comprises applying to an inert carrier a preparation containing a phosphorus compound of the formula



wherein R_1 and R_2 each are alkyl with 1 to 6 carbon atoms, X is alkylene with 1 to 4 carbon atoms and A is phenyl, or phenyl substituted by hydroxyl, alkoxy with 1 to 4 carbon atoms, alkyl with 1 to 4 carbon atoms, alkoxycarbonyl with 2 to 5 carbon atoms, phenyl or halogen, and n is 1 or 2, then bringing the carrier into contact with the surface of the fiber material which is to be flameproofed, thereafter subjecting the carrier and the material to be finished to a heat treatment at 150° to 220° C until the phosphorus compound has been transferred to the fiber material, and then separating the finished material from the carrier.

3,993,853
PREPARATION OF FUNCTIONAL POLYMERS

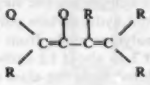
Charles M. Selman, and Carl A. Uraneck, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Oct. 24, 1975, Ser. No. 625,743

Int. Cl.² C08F 8/412, 8/08, 36/14

U.S. Cl. 526—20 **22 Claims**

1. A process for preparing a hydroxy functional polymer which comprises copolymerizing at least one conjugated diene, or at least one conjugated diene with at least one monovinyl-substituted aromatic hydrocarbon, with as comonomer a minor effective amount of a lithium salt of a monohydroxyalkyl-substituted conjugated alkadiene which represents the reaction product of a hydroxyalkyl-substituted conjugated alkadiene with lithium or with a hydrocarbyllithium compound wherein said hydroxyalkyl-substituted conjugated alkadiene is represented by the formula



wherein Q is R or a hydroxyalkyl group represented by

wherein each R is hydrogen or is an alkyl, cycloalkyl, aryl, or combination radical; each R′ is hydrogen, methyl, or ethyl; n is an integer of 1 to 3; such that said hydroxyalkyl-substituted conjugated alkadiene contains 1 hydroxyalkyl group per molecule; said copolymerizing conducted under solution polymerization conditions of temperature and pressure and employing an effective amount of a lithium-based initiator of hydrocarbyllithium compound, thereby producing said hydroxy functional polymer.

3,993,854
ORGANOLITHIUM/ALKADIENOL ADDUCTS AS POLYMERIZATION INITIATORS

Carl A. Uraneck, and Richard L. Smith, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

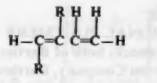
Filed Oct. 24, 1975, Ser. No. 625,745

Int. Cl.³ C08F 8/42, 8/08, 36/14

U.S. Cl. 526—021 **25 Claims**

1. A polymerization process which comprises polymerizing at least one vinylidene group-containing monomer under anionic solution polymerization conditions in a hydrocarbon diluent employing a lithium-based adduct polymerization initiator, effective polymerization conditions of temperature, pressure, and time, and effective ratios of said lithium-based adduct,

wherein said lithium-based adduct polymerization initiator is the reaction product of a hydrocarbon lithium compound with a monohydroxyalkyl-substituted conjugated alkadiene, which is represented by the formula.



(I)

wherein R is hydrogen or a hydroalkyl group such that (I) contains a single hydroxyalkyl group and wherein said (I) contains 5 to 10 carbon atoms per molecule.

3,993,855

SELECTIVE HYDROGENATION OF UNSATURATED HYDROCARBON POLYMERS

Jung Wong Kang, Clinton, Ohio, assignor to The Firestone Tire & Rubber Company, Akron, Ohio

Filed Aug. 29, 1975, Ser. No. 608,938

Int. Cl.² C08F 8/04

U.S. Cl. 526—25 **19 Claims**

1. A process for the selective hydrogenation of unsaturated hydrocarbon polymers comprising the steps of;

adding an unsaturated hydrocarbon polymer to a vessel,

said hydrocarbon polymer made from unsaturated monomers having from 3 to about 12 carbon atoms,

said monomers selected from the class consisting of dienes and alkynes,

adding hydrogen to said vessel;

adding from about 0.5 to about 10.0 millimoles per 100 grams of polymer of a catalytic compound selected from the group consisting of $RhCl[PPh_3]_3$, $RhClCO[PPh_3]_2$, $RhHCO[PPh_3]_3$, $RuHCl[PPh_3]_3$, and $IrH_5[PPh_3]_3$ said catalytic compound selectively hydrogenating pendant points of unsaturation on said hydrocarbon polymer.

3,993,856

PROCESS FOR POLYMERIZING BUTADIENE

Adel Farhan Halasa, Bath, Ohio, assignor to The Firestone Tire & Rubber Company, Akron, Ohio

Continuation-in-part of Ser. No. 491,723, July 25, 1974, abandoned. This application May 5, 1975, Ser. No. 574,793

Int. Cl.² C08F 4/26, 4/52

U.S. Cl. 526—140 **26 Claims**

1. A process for the preparation of polybutadiene high in cis-1,4 microstructure which comprises polymerizing 1,3-butadiene in the liquid phase in the presence of a catalyst composition consisting essentially of:

a. a cobalt-containing component selected from the class consisting of cobalt halides, carboxylates, thiocarboxylates, carbonate, thiocarbonate and complexes of said halides, carboxylates, thiocarboxylates, carbonate and thiocarbonate, said complex being formed between the cobalt and a nitrogen, keto or thioketo group in the same compound or with a separate cyclic compound having both a nitrogen and keto or thioketo group therein;

b. a reducing agent having the formula $RAlX_2$ wherein R is hydrogen or a hydrocarbon radical of 1–8 carbon atoms, and X is halogen; and

c. CS_2.

3,993,857

METHOD FOR PREPARING SYNTHETIC POWDERS BASED ON POLYVINYL CHLORIDE OR VINYL CHLORIDE COPOLYMERS

Manfred Smolinski, Marl, and Josef Kalka, Herten, both of Germany, assignors to Chemische Werke Huls Aktiengesellschaft

Filed Sept. 11, 1974, Ser. No. 505,069

Claims priority, application Germany, Sept. 27, 1973, 2348592

Int. Cl.³ C08F 47/00, 3/30

U.S. Cl. 528—502 **5 Claims**

1. In a method for preparing uniform, finely divided powdery vinyl chloride polymer particles by spray drying a dispersion of polymerized vinyl chloride or a polymerized mixture of vinyl chloride monomer and unsaturated polymerizable compounds with single material nozzles, the improvement comprising applying an atomization pressure in excess of 500bars wherein said atomization pressure is about 550 to 1000 bars.

3,993,858

DIRECT CURRENT PORTABLE GUN WELDER SYSTEM

David Sciaky, Chicago, Ill., assignor to Welding Research, Inc., Chicago, Ill.

Filed Dec. 18, 1974, Ser. No. 533,769
Int. Cl.² H01B 7/34, 7/22
U.S. Cl. 174—15 WF 1 Claim

1. A flexible cable having terminals at one end for connection to a source of direct current and terminals at the opposite end suitable for connection to a portable resistance welding gun, the said flexible cable comprising:

a pair of water-cooled flexible conductors fitted with the said terminals at each end, each conductor encased in a flexible impermiable insulating sleeve whose ends are sealed to their respective terminals, with each conductor having at its center a hollow core through which water may be circulated;

an additional flexible sleeve surrounding the said pair of water-cooled conductors;

separate means, distributed along the length of the said additional flexible sleeve for maintaining the said conductors within the said sleeve at a fixed distance from one another while allowing the said cable assembly to bend about any line passing diametrically through and normal to both conductors, comprising pairs of flat rectangular plates which form a sandwich assembly with portions of the material of the additional flexible sleeve surrounding both conductors, the said assembly being fastened by a bolt through each of said pairs of plates and the sleeve material between the said plates.

3,993,859

FLUID-TIGHT ENCLOSURE FOR GEOPHONE AND CABLE

William O. McNeel, Houston, Tex., assignor to Geo Space Corporation, Houston, Tex.

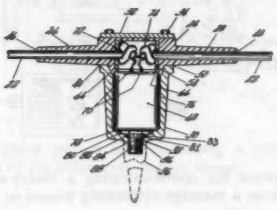
Filed July 29, 1974, Ser. No. 492,902
Disclosure was also published under second Trial Voluntary Protest Program on Feb. 24, 1976
Int. Cl.² G01V 1/16
U.S. Cl. 174—52 R 17 Claims

1. A fluid-tight enclosure adapted to encase a geophone electrically connected to a cable comprising

a housing means having an open end and inner walls defining a cavity adapted to receive a said geophone;

a flexible sealing means positioned in the open end of said housing and having a hollowed out central area and cable entry means adapted to have a said cable extended therethrough into the hollowed out central area to be electrically connected to a said geophone, said flexible sealing means having a resilient sealing edge located on the surface of the flexible sealing means for forming a fluid-tight sealing engagement with said housing means;

a stress ring having a relatively thin outer wall and a pair of aligned opposing holes extending through said thin outer wall, said stress ring being positioned within the hollowed out central area of said flexible sealing means and having the opposing holes thereof in alignment with the cable entry means enabling a said cable to extend therethrough into the hollowed out central area, said stress ring having an inner diameter to enclose a knot-anchored takeout formed in said cable and to support a knot-anchored takeout and a cable in a substantially fixed position thereagainst to prevent withdrawal of a said cable from said stress ring through said flexible sealing means;



insulating means positioned in engagement with the inner walls of said housing means to electrically insulate the housing means from the exterior of a said geophone; and

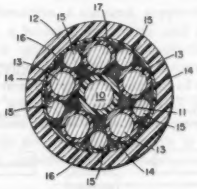
means clamping said flexible sealing means into intimate fluid-tight contact with said housing means and fluid-tight contact between the cable entry means and a said cable extending therethrough forming a pressured fluid-tight seal between said flexible sealing means and said housing means and between the outer periphery of said sealing means and said cable and for urging said stress ring against a said geophone to prevent movement thereof in the cavity of said housing means.

3,993,860

ELECTRICAL CABLE ADAPTED FOR USE ON A TRACTOR TRAILER

John P. Snow, Sagamore Hills, and James J. Callahan, Mentor, both of Ohio, assignors to Samuel Moore and Company, Aurora, Ohio

Filed Aug. 18, 1975, Ser. No. 605,389
Int. Cl.² H01B 7/06
U.S. Cl. 174—69 10 Claims

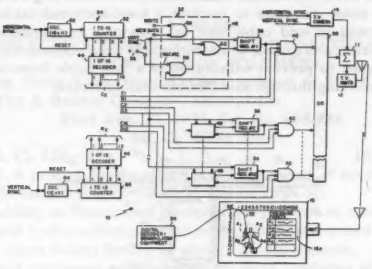


1. An electrical cable comprising a polymeric sheath, a first insulated stranded wire conductor disposed in the sheath and substantially co-axial therewith, four to six insulated stranded conductors of smaller gauge than the first conductor disposed about the periphery of the first conductor, uninsulated stranded conductors of smaller gauge than the said smaller insulated conductors, and an electrically insulating filler material disposed in the spaces between the said conductors combining to form a cable which is substantially circular in cross-section tightly enclosed in said sheath.

3,993,861
DIGITAL VIDEO MODULATION AND DEMODULATION SYSTEM

Ralph H. Baer, Manchester, N.H., assignor to Sanders Associates, Inc., South Nashua, N.H.

Filed Mar. 24, 1975, Ser. No. 561,131
Int. Cl.² H04N 7/00
U.S. Cl. 178—5.6 **18 Claims**



1. A system for communicating a binary-coded, digital message from a message originating source to a raster scan display, comprising:

synchronization means including means for generating raster scan vertical and horizontal synchronization signals;

means for generating message signals corresponding to a binarycoded, digital message at a rate greater than the vertical synchronization rate;

means for generating composite video signals including said synchronization signals and said message signals representing a raster scan picture on a raster scan display;

means for applying the message signals to the composite video signal generating means in timed relation to the synchronization signals so that the message appears as binary-coded, digital brightness modulation at a rate greater than the vertical synchronization rate in one or more viewing areas of the raster scan display picture;

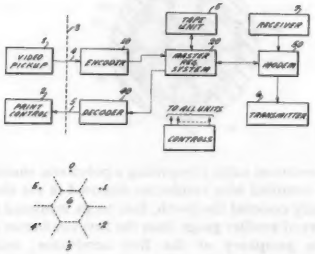
a raster scan display for receiving the composite video signals; and

means at the display for optically detecting the brightness modulation in the areas of the raster scan display picture.

3,993,862
DATA COMPRESSION

Lawrence Karr, 220 Horizon Ave., Venice, Calif. 90291

Filed July 5, 1974, Ser. No. 485,810
Int. Cl.² H04N 5/38; G01N 27/42; H04L 27/00
U.S. Cl. 178—6 **37 Claims**



1. In a facsimile unit which includes a video pick-up to provide a train of video signals and a reproduction unit operating in response to a train of control signals to obtain a facsimile reproduction, further having a transmitter for transmitting modulated carrier signals and a receiver for receiving such signals, comprising:

first means for converting the video signals into a sequence of run length numbers represented by a train of ternary digits;

a buffer system for storing portions of the train of ternary digits;

a record/reproduce unit for calling on the buffer system and recording the ternary digits, the ternary digits passing again through the buffer system on reproduction;

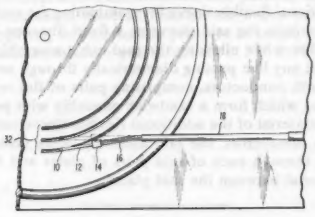
a modem having a modulation unit to provide for modulation of a carrier by means of symbols in groups of one and two ternary digits and at a particular symbol rate, the modem connected to the transmitter to obtain the transmission of these phase modulated signals; and

the modem having a demodulation unit to demodulate the signals as received by the receiver and converting them into a stream of ternary digits, the digits being stored in the buffer system and the tape unit until reproduction by the facsimile reproduction unit.

3,993,863
DISC RECORD GROOVE SKIPPER

Marvin Allan Leedom, South Brunswick Township, and John Clifford Bleazey, Trenton, both of N.J., assignors to RCA Corporation, New York, N.Y.

Filed Aug. 22, 1974, Ser. No. 499,557
Int. Cl.² H04N 5/76
U.S. Cl. 178—6.6 DD **13 Claims**



1. A system for repetitively tracking a selected convolution of a spiral groove of a rotating disc record containing recorded information including regularly recurring signals, comprising:

a signal pickup stylus for recovering said recorded information;

a pivoted support arm for positioning said stylus in the groove of said disc record during rotation thereof;

a bimorph element mechanically interposed between said stylus and said support arm and normally in alignment with said support arm, but subject to bending out of said alignment upon electrical actuation;

control means electrically coupled to said bimorph element for selectively providing actuation thereof once each disc record revolution; and

means responsive to said regularly recurring signals recovered by said stylus for timing said actuations.

3,993,864

TELEVISION CAMERA ARRANGEMENT IN WHICH ELECTRICALLY GENERATED DATA IS SUPERIMPOSED ON THE VIDEO PICTURE INFORMATION

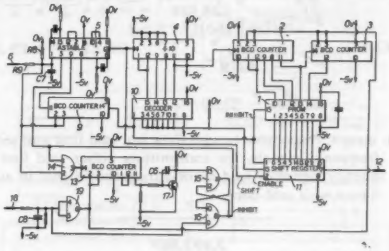
Allan Sydney Pye, Southminster, and Peter Raymond Digby, Chelmsford, both of England, assignors to Elliott Brothers (London) Limited, London, England

Filed July 28, 1975, Ser. No. 599,550

Claims priority, application United Kingdom, July 28, 1974, 35123/74

Int. Cl.² H04N *5/38, 5/22*

U.S. Cl. 178—7.1 **4 Claims**



1. A television camera arrangement wherein in order to provide in the video signal output thereof character or symbol information, accommodation is provided for a read only memory programmed in accordance with the character or symbol information required, and said camera arrangement includes means synchronised with the video signal timing circuits of the camera, for reading out in video signal form the information with which the read only memory is programmed and means for mixing said last mentioned information with video signal output generated in accordance with a scene being viewed by said camera arrangement, accommodation for said read only memory being provided such that a read only memory is readily removable so that any one of a number of read only memories programmed with different character or symbol information may be accommodated in said camera arrangement.

3,993,865

SCANNING SYSTEMS

Arthur Browne, Horley, and Francis John Witts, Outwood, near Redhill, both of England, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Sept. 4, 1975, Ser. No. 610,444

Claims priority, application United Kingdom, Sept. 13, 1974, 40068/74

Int. Cl.² H04M *3/10*

U.S. Cl. 178—7.6 **8 Claims**

1. A data scanning and storage system comprising in combination:

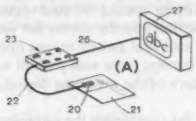
a. an odometer device including a rotor which can be rolled along a line of data by hand and an electric pulse generator driven by said rotor for generating strobe pulses at a rate dependent on movement of said odometer;

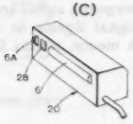
b. a line of photo detectors carried by said odometer

c. optical means secured to said odometer for the purpose of imaging on to said line of detectors at any instant an area of data adjacent to the odometer, said area being substantially parallel to the axis of rotation of said rotor i.e. substantially normal to the direction of hand movement;

d. a store for a two-dimensional picture having storage elements at least notionally arranged in rows and columns, the number of rows being equal to the number of said detectors; and

e. means for loading into a column of said store new data brightness values derived from said detectors when a





strobe pulse occurs and discarding a corresponding amount of the oldest information stored.

3,993,866

CAMERA CAPSULE

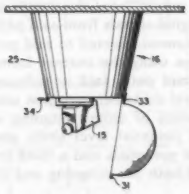
David L. Pearl, deceased, late of Atlanta, Ga., by Peggy P. Pearl, heir, 4027 N. Strafford, NE., Atlanta, Ga. 31705, and David M. Blackshear, 436 Safari Circle, Stone Mountain, Ga. 30083

Continuation of Ser. No. 244,469, April 17, 1972, abandoned. This application June 20, 1974, Ser. No. 481,318

The portion of the term of this patent subsequent to June 25, 1991, has been disclaimed.

Int. Cl.² H04N *5/26, 7/18*

U.S. Cl. 178—7.81 **17 Claims**



1. In combination, a camera, support means connected to said camera, a housing enclosing said camera, said housing comprising a generally hemispherical transparent cover coated generally uniformly with chromium or the like of a density sufficient to reflect a portion of the light from outside said housing away from said housing whereby the cover is transparent from its darker side and generally reflective from its lighter side so that said camera is usually substantially invisible from outside said housing.

3,993,867

DIGITAL SINGLE SIGNAL LINE FULL DUPLEX METHOD AND APPARATUS

William R. Blood, Jr., Phoenix, Ariz., assignor to Motorola, Inc., Chicago, Ill.

Filed Oct. 15, 1974, Ser. No. 514,526

Int. Cl.² H04L *5/14*

U.S. Cl. 178—58 R **12 Claims**

1. A digital transmission system comprising:

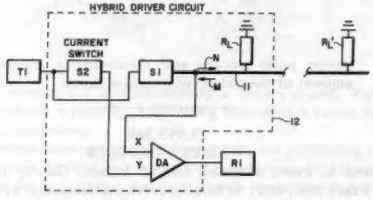
at least a pair of stations, at least one of said stations having transmitting means and receiving means;

a single bus transmission signal path for carrying the incoming and outgoing digital signals and operatively connectable to said transmitting and said receiving means;

first means for applying the outgoing digital signals from said transmitting means to said path, said first means including current source means for supplying a constant current and said first switch means operating to supply or cut off said current from said path in accordance with the shifting pattern of the outgoing digital signals between its two states;

second means for combining the outgoing digital signals and incoming digital signals in said path to form a composite signal which shifts between a plurality of predetermined amplitude levels;

third means for recovering the incoming digital signals from the composite signal and applying the recovered incoming digital signals to said receiver, including second switch means, means for operating said second switch



means in response to the outgoing digital signals from the transmitter for generating digital indication signals which are the same in signal content as that of the outgoing digital signals and which shift between fourth and fifth level potentials, and comparing means having first and second input means, first input means for receiving the composite signal found in said line and second input means for receiving said digital indicating signals and deriving an output from the comparison in the form of incoming digital signals from said path; and

impedance means connected to said path for providing IR voltage drops using the current from the digital signals present in said path, said impedance means providing potential level shifts between first and second potentials in the presence of either outgoing or incoming digital signals and potential level shifts among said first and second level potentials and a third level potential in the presence of both the outgoing and the incoming digital signals.

3,993,868

MINIMUM SHIFT KEYING COMMUNICATION SYSTEM

Joseph Francis Balcewicz, Hightstown, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Aug. 19, 1974, Ser. No. 498,775

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 2, 1976

Int. Cl.² H04L 27/10

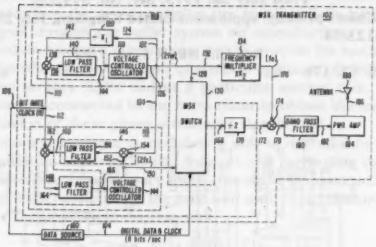
U.S. Cl. 178—66 R **14 Claims**

1. A minimum shift keying (MSK) transmitter for communicating binary data at a given bit rate, said data being represented by first and second frequency signals respectively indicative of predetermined values of said data, comprising:

a. input data source means for providing said data and a clock signal indicative of said bit rate;

b. a first phase locked loop (PLL) means, responsive to said clock signal, for generating a first frequency signal, the ratio of said first frequency to said bit rate being a predetermined ratio of integers, said first PLL means including a frequency divider for maintaining said predetermined ratio of integers;

c. a second phase locked loop means, responsive to said clock signal and said first frequency signal, for generating said second frequency signal such that the frequency difference between said first frequency signal and said second frequency signal is one half the bit rate of said data; and



d. means, responsive to said data and said first and second frequency signals, for transmitting either said first frequency signal or said second frequency signal in accordance with said data.

3,993,869

AMPLIFYING CIRCUIT FOR USE WITH A HIGH IMPEDANCE SOURCE TRANSDUCER

Osamu Kono, Tokyo; Takeshi Matsudaira, Kawasaki, and Makoto Ishikawa, Tokyo, all of Japan, assignors to Sony Corporation, Tokyo, Japan

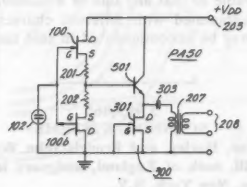
Division of Ser. No. 336,819, Feb. 28, 1973, Pat. No. 3,862,367. This application Oct. 10, 1974, Ser. No. 513,756

Claims priority, application Japan, Mar. 2, 1972, 47-21876; Aug. 15, 1972, 47-81569

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 3, 1976

Int. Cl.² H04R 3/00

U.S. Cl. 179—1 A **8 Claims**



1. An amplifying circuit for use with a signal source comprising first and second field-effect transistors which are of different conductive types, and each of which has gate, drain and source electrodes, the gate electrodes of the first and second field-effect transistors being connected to each other, a pair of resistors in series connecting the source electrodes of the first and second field-effect transistors to each other in a source follower configuration so as to present a low output impedance, means connecting the signal source between the interconnected gate electrodes of the first and second field-effect transistors and the drain electrode of the second field-effect transistor, said first and second field effect being selected to have small values of drain-source current in the absence of any gate-source bias, a third transistor which has control, output and common electrodes, means connecting said control electrode to said resistors at a connection point between the latter, a constant current source connected to said output electrode, means for supplying power to said drain electrode of said first field-effect transistor and to said common electrode of the third transistor, an output circuit connected between said output electrode of the third transistor

and said drain electrode of the second field-effect transistor, said third transistor and said constant current source cooperating to provide a high load impedance for said first and second field effect transistors, and said third transistor being selected to have a relatively high common to output electrode current in the absence of any control to output electrode bias.

3,993,870

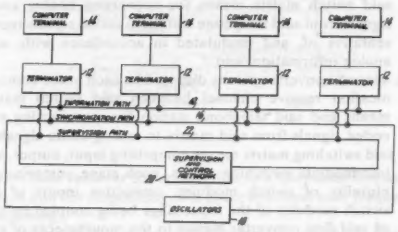
TIME MULTIPLEX SYSTEM WITH SEPARATE DATA, SYNC AND SUPERVISION BUSSES

Norman L. Schwartz, Stony Brook, N.Y., assignor to Multiplex Communications, Inc., Hauppage, N.Y.

Continuation-in-part of Ser. No. 414,434, Nov. 9, 1973, Pat. No. 3,916,106. This application Mar. 5, 1975, Ser. No. 555,562

Int. Cl.² H04J *5/00*

U.S. Cl. 179—15 BS **8 Claims**



1. Time-division multiplex communication system including an information path consisting of a plurality of discreet lines for carrying samples of signals transmitted within selected time slots recurring once per frame, a synchronization path for carrying synchronization signals which separately identify time slots as they occur, and oscillator means for generating a recurring series of synchronization signals supplied to the synchronization path each signal uniquely identifying a simultaneously occuring time slot, wherein the improvement comprises a plurality of terminator means for providing data inputs to the information path and receiving data outputs from the information path, each terminator including comparator means for receiving the signals carried by the synchronization path and for periodically producing a comparator output in response to the occurrence of a preselected synchronization signal combination, demultiplexer means for summing successive input samples sequentially selected from more than one discreet line of the information path, said demultiplexer being responsive to the oscillator means for synchronization with the information path, and multiplexer means for sequentially distributing successive output samples among more than one discreet line of the information path.

3,993,871

RELAY MATRIX FOR SELECTOR NETWORKS

Royne Gunnar Hjortendal, Sorunda, and Jöns Kurt Alvar Olsson, Tullinge, both of Sweden, assignors to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden

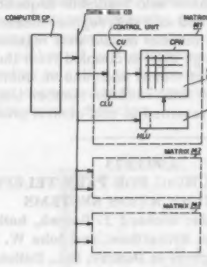
Filed May 29, 1975, Ser. No. 581,932

Claims priority, application Sweden, June 10, 1974, 7407637; May 20, 1975, 7505731

Int. Cl.² H04M *3/00*

U.S. Cl. 179—18 GF **12 Claims**

1. A relay matrix comprising: a plurality of relays arranged in rows and columns, each of said relays having first and second energizing terminals; a plurality of row conductors, each associated with a row of relays, each of said row conductors being connected to the first energizing terminal of each relay of the respective row; a plurality of bistable switching means, each having first and second current transfer terminals and a control terminal, each of the first current transfer terminals of each of said bistable switching means being connected to a reference voltage, each of the second current transfer terminals of each of said bistable switching means being connected to the second energizing terminal of a different one of said relays respectively; row selection means for selectively



applying an energizing voltage to a selected one of said row conductors; and column selection means for selectively applying a control signal to the control input of a selected one of said bistable switching means for initiating current conduction through said bistable switching means during the presence of an energizing voltage on the associated row conductor.

3,993,872

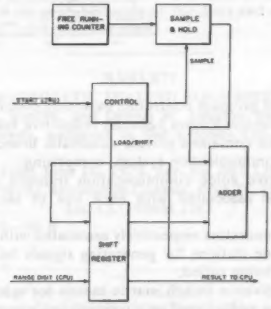
RANDOM NUMBER GENERATOR FOR A TRAFFIC DISTRIBUTOR

Robert A. Borbas, Box 818, and James H. Foster, 33 Marsha Drive, Apt. 11, both of Brockville, Ontario, Canada

Filed Sept. 27, 1974, Ser. No. 509,981

Int. Cl.² H04Q *3/54*

U.S. Cl. 179—18 ES **7 Claims**



1. A random number generator for a traffic distributor for a communication switching system, said system comprising numerous subsystems, a central processor controlling the subsystems, and wherein said central processor produces a range digit, said random number generator comprising:

counter means for providing random counter numbers;

storage means connected to said counter means for sampling and storing a random counter number in response to a command from said central processor;

adder means connected to said storage means for receiving said random counter number;

shift register means connected to said central processor and to said adder means for storing said range digit from said central processor and a final random number upon generation thereof;

said adder means and said shift register means providing a final random number derived as a product of said random

counter number and said range digit in a load/shift sequence, said final random number being less than said range digit; and

control means connected to said central processor, said shift register means, and said storage means for receiving said command from said central processor to initiate storage of said random counter number in said storage means and to control said load/shift sequence between said adder means and said shift register means for storing said final random number in said shift register means;

whereby when a range digit is coupled from the processor to said shift register means said random number generator produces said final random number less than said range digit to be returned to said central processor.

3,993,873

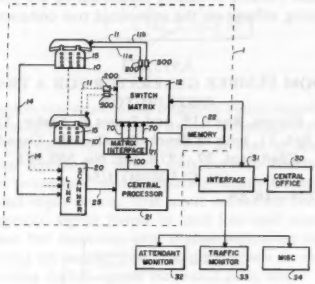
DIGITAL SWITCHING FOR PABX TELEPHONE COMMUNICATION SYSTEMS

Michael Vincent Bogda; Richard J. Bousek, both of Plano; Frederick G. Doidge, Richardson, and John W. Israel, Dallas, all of Tex., assignors to Danray, Inc., Dallas, Tex.

Continuation-in-part of Ser. No. 376,923, July 5, 1973, abandoned. This application Jan. 31, 1975, Ser. No. 545,895

Int. Cl.² H04Q *3/54*

U.S. Cl. 179—18 ES **6 Claims**



5. A stored program controlled switching system for effecting audio communication between respective telephone stations of a self-contained private automatic branch exchange telephone communication system, comprising:

a. respective voice communication transmit and receive channels associated with each one of said telephone stations,

b. signal generators respectively associated with each of said telephone stations for generating signals indicative of a station being called,

c. space division switch matrix means for selectively coupling the audio signal on a transmit voice communication channel of one said telephone stations to a receive voice communication channel of another of said telephone stations, all of said transmit and receive communication channels being connected to said switch matrix means, said switch matrix means comprising a plurality of digital switches, selected ones when closed, establishing a communication path through said matrix for establishing communication between transmit and receive channels of selected called and calling stations,

d. stored program processor means for generating a digitally encoded address signal in response to the receipt of digital command signals indicating a calling station and a station being called by said calling station, said processor means comprising means for determining the identification of switches of said switch matrix to be closed in order to effect coupling of the voice communication channels of the calling and called stations, and means for generating said digitally encoded address signal representative of the so identified switches,

e. line scanner means having respective inputs coupled to the signal generators of each telephone station and an output coupled solely to said stored program processor means, said line scanner means generating said digital command signals in response to, and representative of, the generated signals from said signal generators indicating the station being called and the identification of the calling station,

f. switch matrix interface means interposed between said matrix means and said processor means, said interface means being responsive to said digitally encoded address signal from said processor means for providing enabling signals to said matrix means to selectively close certain ones of said digital switches in said switch matrix means defined by said address signal, thereby to establish said communication path,

g. first converter means disposed in each voice communication transmit channel between said telephone station and said switch matrix means for converting analog audio signals from said telephone station to coded signals representative of, and modulated in accordance with, said analog information, and

h. second converter means disposed in each voice communication receive channel between said switch matrix means and said telephone station for reconverting said coded signals from said matrix to analog audio signals;

i. said switching matrix means comprising input, output, and intermediate switching stages, each stage comprising a plurality of switch modules, respective inputs of the switch modules of the input stage being coupled by way of said first converter means to the mouthpieces of said telephone stations, respective outputs from the switch modules of the output stage being coupled by way of said second converter means to the earpieces of the telephone stations, and the outputs from the switch modules of the input stage and the inputs to the switch modules of the output stage being respectively coupled to the inputs and outputs of the switch modules in the intermediate stage.

3,993,874

MULTI-STAGE SWITCHING NETWORKS FOR USE IN TELECOMMUNICATIONS EXCHANGES

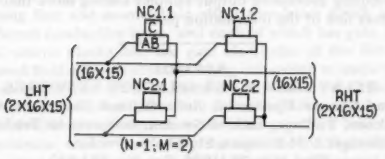
John Spencer Arnold, Liverpool, and James Leonard Charles Grimbly, Birkenhead, both of England, assignors to Plessey Handel und Investments AG., Zug, Switzerland

Filed Nov. 21, 1974, Ser. No. 526,043

Claims priority, application United Kingdom, Nov. 22, 1973, 54200/73

Int. Cl.² H04Q *3/00*

U.S. Cl. 179—22 **5 Claims**



1. A matrix switching network for switching between first multi-conductor trunks at one side thereof and second multi-conductor trunks at the other side thereof, comprising a plurality of switching devices arranged symmetrically in columns and rows comprising at least two stages of matrix switches at each co-ordinate location, said switching devices of each individual row having terminations at one side thereof multiplied and connected selectively to the first trunks and said switching devices of each individual column having termina-

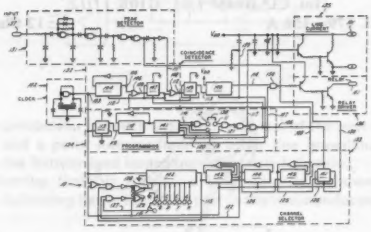
tions at the other side multipled and connected selectively to the second trunks.

3,993,875

TONE RECEIVER

Theran L. Ebner, and Donald W. Hawkins, both of Houston, Tex., assignors to Houston Natural Gas Corporation, Houston, Tex.

Filed May 23, 1975, Ser. No. 580,277
Int. Cl.² H04M 1/50
U.S. Cl. 179—84 VF 10 Claims



1. A tone receiver for connection to a telephone line at the station end for responding to a predetermined tone frequency comprising,

an input adapted to be connected to the telephone line for receiving said predetermined tone frequency, including means generating a synchronizing pulse at the same point on each input tone frequency cycle,

channel frequency selector circuit means connected to the input for allowing the receiver to respond to only one of a plurality of tone frequencies,

coincidence detector circuit means connected to the input and to the output of the channel frequency selector circuit for registering coincidence in time with the synchronizing pulse of input tone frequency and the output of the channel frequency selector circuit,

programming circuit means having an output connected to the coincidence detector circuit for allowing the receiver to sample the input tone frequency during a predetermined time interval,

storage means connectecd to the output of the coincidence detector circuit means for counting a predetermined number of times coincidence between the input tone frequency and the output of the channel frequency selector circuit occurs during the predetermined time interval,

means connected to the output of the storage means which is enabled by the storage means when a predetermined count of coincidence between the input tone frequency and the output of the channel frequency selector circuit has occurred,

clock means connected to the channel frequency selector circuit, the coincidence detector circuit, and the programming circuit for providing timing signals.

3,993,876

AUTOMATIC DIALING APPARATUS FOR TELEPHONES

William J. Davis, 74 Shady Tree Lane, Carson City, Nev. 89701

Filed Mar. 20, 1975, Ser. No. 560,251
Int. Cl.² H04M 1/45
U.S. Cl. 179—90 B 10 Claims

1. An automatic dialing apparatus for telephones having dialing systems operated by coded sequential interruptions thereof comprising:

A. a scanning switch;

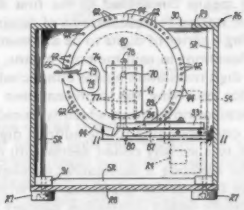
B. means for connecting the scanning switch in series with such a system;

C. a rotary turntable;

D. a disc adapted removably to be mounted on the turntable for rotation therewith,

1. the disc having a telephone number encoded thereon in an annular pattern in the form of a succession of series of spaced protuberances with the protuberances being substantially equally spaced in each series, the successive series being sustantially equally spaced and the number of proturberances in each series corresponding to a digit to be dialed by the series;

E. a motor connected to the turntable to rotate the same in a predetermined direction;



F. a source of electrical energy connected to the motor;

G. a normally closed switch in series with said motor and source;

H. means borne by the turntable for rotation therewith engageable with the normally closed switch to open the same after each complete revolution of the turntable;

I. means on the disc for manually rotating the turntable a distance in the direction of motor rotation thereof sufficient to permit the normally closed switch to close and initiate a new motor driven revolution in response to the removable mounting of the disc on the turntable; and

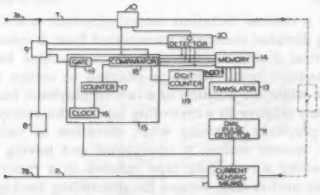
J. means mounting the scanning switch in a position to traverse the protuberances on the discs and to be opened by each such protuberance.

3,993,877

AUTOMATIC DIALING EQUIPMENT

Andrzej M. Sendyk, and Dennis W. Johnson, both of Saskatoon, Canada, assignors to Sed Systems Ltd., Saskatoon, Canada

Filed June 16, 1975, Ser. No. 587,138
Claims priority, application Canada, June 21, 1974, 203023
Int. Cl.² H04M 1/45
U.S. Cl. 179—90 B 14 Claims



1. An automatic dialer for connection to a pair of leads of a telephone line which may interconnect a station set with a central office comprising:

a. a dummy load in series with a normally open switch, connected between the pair of wires of said telephone line,

b. means for closing said switch, at least during periods of the interruption of current flow in said wires to the station set, during station set address digit dialing,

c. a normally closed switch in series with one of the wires of the telephone line leading to the station set, between the dummy load and the station set,

d. current sensing means connected in series with one of said leads for determining the existence of current flow in said leads,

e. dial pulse detection means connected to the current sensor for measuring the period of any break in the current flow, to determine the existence of a dial pulse,

f. pulse counting means connected to the dial pulse detection means or counting detected pulses which comprise an address digit,

g. first digit translation means connected to the pulse counting means for converting the counted number of pulses into an address location signal,

h. memory means connected to the first digit translation means for storing representations of destination numbers comprising a series of digits to be automatically dialed, at address locations in said memory means,

i. a second digit translation means connected to the memory means, for receiving the representation of a predetermined destination number which is stored at the address location corresponding to the address digit, and for converting it to a serially coded destination number signal,

j. means for applying a destination number digit series in dial pulse form to the telephone line which corresponds to the serially coded destination number signal, and

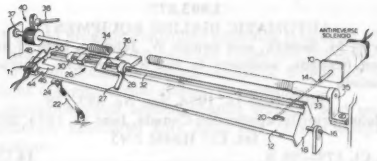
k. means connected to said (d) means and said (i) means, including said (j) means for pulsing said normally open switch to generate the destination number digit series dial pulses, and for opening said normally closed switch during the entire destination number digit series dial pulsing period.

3,993,878

ANTI-REVERSE MEANS FOR CENTRAL DICTATION EQUIPMENT

Allan Janes, Toronto, Canada, assignor to Allan Janes, Toronto, Canada

Filed Mar. 20, 1975, Ser. No. 560,385
Int. Cl.² G11B *15/20, 27/10*
U.S. Cl. 179—100.1 DR **10 Claims**



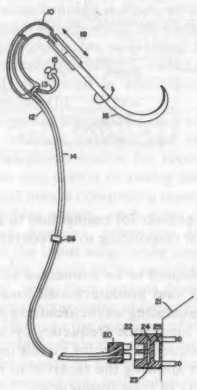
1. In a central dictation record-playback machine for recording dictated messages transmitted from a remote station, the central dictation record-playback machine having a record medium index which is adapted to return to its start position while the position of a record-playback head remains stationary relative to a recording tape of the central dictation record-playback machine when dictation of each message from a remote station is completed and having means for backspacing a recording tape relative to a record-playback head, an anti-reverse means for precluding backspacing into and playing back previously recorded messages on the central dictation record-playback machine comprising means for returning the record medium index to its start position upon command from a remote station when dictation of a message from a remote station is completed, a normally open contact which is closed when the record medium index is returned to its start position, said contact being so connected to the means for backspacing that activation of such means is precluded as long as said record medium index is in its start position, said means for backspacing being capable of activation upon command from a remote station when said contact is open, said record medium index being moved from its start position during subsequent dictation of a message from a remote station to the central dictation record-playback machine and with such movement said contact being opened so that backspacing into and playing back the message being presently recorded is permitted.

3,993,879

ACOUSTICAL COMMUNICATIONS HEADSET

Wallace Keith Larkin, 360 Hidden Valley Road, Soquel, Calif. 95073

Filed Mar. 24, 1975, Ser. No. 561,473
Int. Cl.² H04M *1/05*; G10K *11/12*
U.S. Cl. 179—156 A **12 Claims**



1. An acoustical communications headset for use with communications equipment, said headset comprising:

a transmitter tube having one end detachably coupled to the communications equipment for conducting sound thereto and the other end terminating in a mouthpiece tube positioned near the user's mouth for conducting sound therefrom;

a receiver tube detachably coupled at one end to the communications equipment for conducting sound therefrom and at the other end terminating in an ear tube positioned in the user's ear for conducting sound thereto; and

head mounted support means for supporting the other ends of the transmitter, mouthpiece, receiver and ear tubes, respectively, adjacent the user's ear and for conducting sound from the mouthpiece tube to the transmitter tube and from the receiver tube to the ear tube.

3,993,880

RESISTIVE BATTERY FEED FOR LINE CIRCUITS

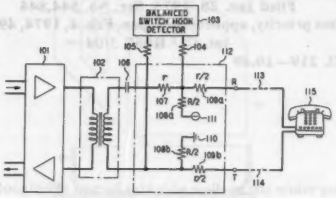
John Francis O'Neill, Boulder, Colo., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Feb. 9, 1976, Ser. No. 656,189
Int. Cl.² H04B *1/52*
U.S. Cl. 179—170 D **6 Claims**

1. A line circuit connecting a two-conductor line across a two-terminal port circuit including a pair of battery feed impedances of equal value, each supplying a dc source to one line conductor, characterized by

a pair of line impedances of equal value each connecting one battery feed impedance to a corresponding line conductor;

a further impedance connected in series with one terminal of the port circuit and a point intermediate one of the line impedances and the battery feed impedance connected thereto, and



a connection between the other terminal of the port circuit and a point intermediate the other line impedance and the battery feed impedance connected thereto,

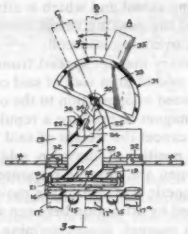
whereby there is formed a longitudinally balanced pad delivering battery feed current to the two-conductor line.

3,993,881

SNAP-ACTION SLIDE SWITCH

Dominic O. Marsillo, Flourtown, Pa., assignor to Continental-Wirt Electronics Corporation, Warminster, Pa.

Filed Nov. 5, 1975, Ser. No. 628,883
Int. Cl.² H01H *15/18*
U.S. Cl. 200—76 **15 Claims**



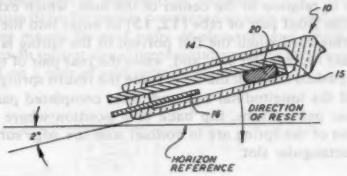
1. A snap action slide switch comprising a switch assembly which includes a slidable insulated support mounting an elongated electrical contact movable therewith and a relatively fixed insulated support mounting a plurality of relatively fixed contact terminals spaced along the path of travel of said movable contact in underlying relation thereto, said movable contact being adapted to electrically bridge at least two adjacent ones of said spaced contact terminals upon shifting movement of said contact into one or the other of its endmost positions, and pivoted rocker means operatively associated with said switch assembly for shifting said slidable contact support along its said path of travel, said rocker means including a freely depending lever arm and said slidable contact support having resilient means operatively engaged and adapted to be temporarily flexed by said rocker lever arm when the latter is rocked about its pivot in either direction to move said slidable contact into a position centered between the opposite endmost positions thereof whereby said resilient means upon said temporary flexure thereof under pressure of said rocker lever arm establishes a releasable force for automatically effecting snap action continued movement of said slidable contact beyond its said centered position.

3,993,882

MICRO-MINIATURE MERCURY TILT-TYPE INERTIA SWITCH

Robert P. Romano, Glen Ridge, N.J., assignor to The Gordos Corporation, Bloomfield, N.J.

Filed Oct. 7, 1975, Ser. No. 620,400
Int. Cl.² H01H *29/20*
U.S. Cl. 200—220 **4 Claims**



1. In a tilt-type inertia switch;

a. A chamber having both ends sealed;

b. A first electrode rigidly mounted in one end of said chamber, extending substantially through the axial length of said chamber, slightly tilted downward, and having an end perpendicular to its axial length and cooperating with an inner wall of said chamber to form a closed space therebetween;

c. A second electrode rigidly mounted in said one end of said chamber, extending coaxially therewith for only a portion of the length of said first electrode in a spaced apart relationship therewith and into said closed space;

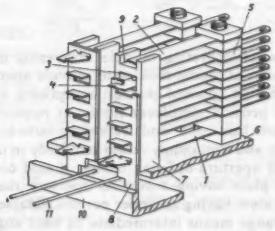
d. A globule of mercury disposed within said chamber in said closed space formed by the cooperation of the inner wall of said chamber with the perpendicular end of said first electrode whereby said globule of mercury is always in contact with said first electrode and said first electrode exerts surface tension on said globule of mercury and whereby said globule of mercury is always in contact with said second electrode unless a rotational downward force of at least 1.4G is exerted on said switch thereby causing said globule of mercury to break contact with said second electrode thereby opening said switch.

3,993,883

CONTACT SPRING SET

Sven-Erik Lindeberg, Huddinge, Sweden, assignor to Telefonaktiebolaget L M Ericsson, Stockholm, Sweden

Filed Mar. 19, 1975, Ser. No. 559,745
Claims priority, application Sweden, Apr. 8, 1974, 7404713
Int. Cl.² H01H *1/28*
U.S. Cl. 200—283 **1 Claim**



1. Contact spring set comprising contact springs and a lifting card attached at the outer ends of the contact springs between an upper return spring mounted above the contact springs and a lower return spring mounted underneath the

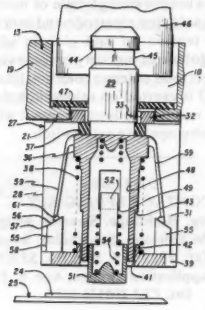
contact springs, characterized in that, to obtain playless fixing of the lifting card (8), at least one of the return springs is flat, the outer end of said return spring (2) having two pairs of tabs (12, 13, 14, 15), one pair behind the other in the longitudinal direction of the spring, said tabs being punched and bent in such manner that adjacent tabs have opposite bending directions, said lifting card (8) having a hole intended for the fixing of the return spring (2), which hole is constituted by a rectangular slot (19) corresponding to the cross section of said return spring and two extensions (20, 21), diametrically placed in relation to the center of the hole, which extensions allow the front pair of tabs (12, 13) to enter into the hole of the lifting card when the flat portion of the spring is aligned with said rectangular slot, and, when the rear pair of tabs (14, 15) is pushed through the hole, force the return spring to twist around the longitudinal axis and, after completed passage of the rear pair of tabs, flip back to a position where the flat surfaces of the spring are in contact with the edge surfaces of said rectangular slot.

3,993,884

DETACHABLY MOUNTED KEYBOARD PUSHBUTTON ACTUATORS AND HOUSING ASSEMBLY

Nicholas Kondur, Rolling Meadows; Peter Scheuzger, Highland Park, and Marshall S. Joseph, Chicago, all of Ill., assignors to Victor Comptometer Corporation, Chicago, Ill.

Filed Sept. 15, 1972, Ser. No. 289,449
Int. Cl.² H01H 3/12, 9/00, 13/00
U.S. Cl. 200—295 **19 Claims**



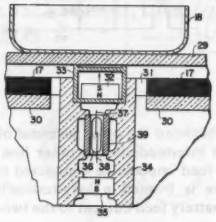
15. A switch-operating module removably mounted in a cover member of plastic molded to provide aperture-defining means including opposed shelves; comprising a plastic body molded to provide cantilever hooks at opposite sides with noses at their free upper ends extending outwardly to engage said shelves and frictionally retain said body in operaive position in said aperture-defining means of said cover member, and a top plate having a vertical aperture therethrough; a plastic key stem having an upper portion slidable in said aperture and flange means intermediate its ends engageable with the lower surface of said top plate; a plastic bottom plate secured to said body having a vertical aperture slidably receiving the lower portion of said key stem; and a return spring interposed between said bottom plate and said key stem flange means normally maintaining the latter in raised position in contact with said top plate.

3,993,885

PAN DETECTOR FOR AN INDUCTION HEATING APPARATUS

Hideyuki Kominami; Keizo Amagami; Yukio Hirai, and Tadao Toyooka, all of Kodama, Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Filed Jan. 28, 1975, Ser. No. 544,844
Claims priority, application Japan, Feb. 4, 1974, 49-14816
Int. Cl.² H05B 5/04
U.S. Cl. 219—10.49 **3 Claims**



1. In an induction heating cooking apparatus of the type including an induction heating coil for electromagnetically coupling to a metal-based cooking vessel placed in use overlying said coil and an inverter circuit operable for supplying said coil with an ultrasonic frequency energization current to develop a time-varying magnetic field and effect electromagnetic heating of the cooking vessel, a detector comprising:

a first magnet movably disposed relative to the bottom wall of said cooking vessel and which is attracted toward and moves toward the cooking vessel when the same is positioned in use overlying said coil;

a second stationary magnet spaced from said first magnet remote from said bottom wall of said cooking vessel with its poles oriented in opposition to the orientation of poles of said first magnet to produce a repulsion therebetween sufficient to cancel the weight of said first magnet;

a reed switch positioned between said first and second magnets to open and close in response to changes in the levels of magnetic flux due to the movement of said first magnet caused by attraction between said cooking vessel and said first magnet; means defining an electric circuit for connecting said reed switch to render said inverter circuit operative when the cooking vessel is positioned overlying said coil and attracting said first magnet thereto, and to otherwise render said inverter circuit inoperative; and

means for electromagnetically shielding said reed switch from the time-varying magnetic field produced by the ultrasonic frequency energization current.

3,993,886

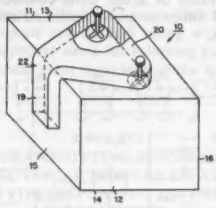
SUPPLY WAVE GUIDE SYSTEM IN MICROWAVE OVENS

Bengt Uno Imberg; Kurt Hakan Karlsson, and Gustav Georg Orke, all of Norrkoping, Sweden, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Aug. 30, 1974, Ser. No. 502,148
Int. Cl.² H05B 9/06
U.S. Cl. 219—10.55 F **16 Claims**

1. A microwave oven comprising, a metallic wall structure defining an oven heating cavity, a flared waveguide for coupling microwave energy from an external source of microwave energy to the oven cavity and having a constant height and a pair of opposed side walls of continuously varying width and terminated at its wider end by a short-circuiting wall, means

for supplying the energy from said energy source to the small end of the flared waveguide, and at least two energy coupling



apertures located in one of said side walls at the wider portion thereof and leading directly into the oven cavity.

3,993,887

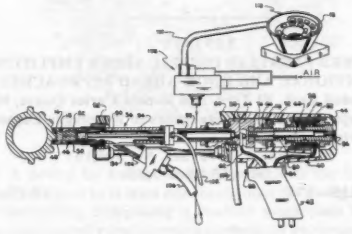
STUD AND METHOD OF WELDING SAME TO A BOILER TUBE

Peter S. Richards, Portland, Oreg., assignor to TRW Inc., Cleveland, Ohio

Continuation of Ser. No. 327,312, Jan. 29, 1973, abandoned. This application Sept. 19, 1974, Ser. No. 507,450

Int. Cl.² B23K *9/20*

U.S. Cl. 219—99 **5 Claims**



1. A boiler tube stud to be welded to a nubbin on a boiler tube, said stud comprising an elongate metal body, said body being of cylindrical shape and of substantially uniform cross section throughout most of its length, said body having a main concave recess centrally located in one end thereof and having a diameter which is more than one-half and less than three-fourths the diameter of said stud body to provide a margin between the recess and the outer surface of said body, said main recess having a flux recess centrally located therein, and a body of flux centrally located in said flux recess, said body of flux filling said flux recess and extending outwardly therefrom, with the extremity of the flux body being within said main recess to the rear of said margin, whereby an outer end of the nubbin can be received in said main recess, the maximum dimension across said flux body being less than the maximum dimension across said main recess.

3,993,888

SCANNING LINE FILTER

Daniel J. Fellman, Williamsville, N.Y., assignor to Calspan Corporation, Buffalo, N.Y.

Filed Oct. 29, 1974, Ser. No. 518,442

Int. Cl.² H01L *31/08*

U.S. Cl. 235—151 **7 Claims**

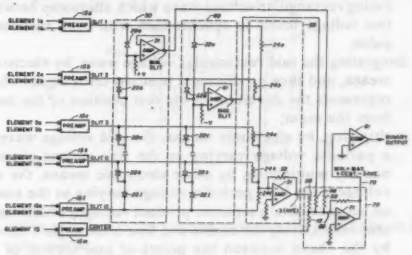
1. An image processing means for enhancing and digitizing images including:

photodiode detector array means defined by a plurality of pairs of diametrically located, radially extending pairs of elements surrounding a central element with each of said elements producing a current output proportional to light incident thereon;

a plurality of preamplifier means for converting the current outputs of each of said pairs of elements and said central element into voltages which are supplied as output signals;

minimum detector means connected to each of said preamplifier means for said pairs of elements and which produces an output signal representative of the least incident light on a pair of said pairs of elements;

maximum detector means connected to each of said preamplifier means for said pairs of elements and which produces an output signal representative of the most incident light on a pair of said pairs of elements;



averaging means connected to each of said preamplifier means for said pairs of elements and which produces an output signal equal to the average value of all of said pairs of elements with a predetermined gain;

summing means for summing the output signals from said minimum detector means, said maximum detector means, said averaging means and said preamplifier means connected to said central element for producing an output signal which is representative of the sum of the signals supplied thereto; and

comparator means connected to said summing means and producing a digital logic signal which is the binary representation of the output of said elements of said photodiode detector array means.

3,993,889

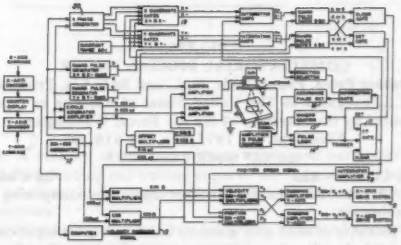
SEAM TRACKING METHOD IMPROVEMENT

Albert M. Sciaky, Palos Park, Ill., assignor to Sciaky Bros., Inc., Chicago, Ill.

Filed Feb. 19, 1976, Ser. No. 659,541

Int. Cl.³ G06G *7/48*; B23K *15/00*

U.S. Cl. 235—151.1 **6 Claims**



1. A method for controlling the motion of an electron gun so that the beam generated by said gun follows, at a constant tangential velocity, the seam along which two parts to be welded adjoin, comprising the steps of:

generating, accelerating and focusing an electron beam;

directing the beam so that in its at rest position it impinges upon the work at a point close to the said seam;

deflecting the beam, so that it follows a circular path which crosses the said seam twice during each revolution of said beam, by applying two periodically varying magnetic or electrostatic forces normal to said beam along mutually perpendicular axes, one of said forces directed along one of said axes and varying in proportion to R (sine ωt + sine θ) and a second of said forces directed along the other of said axes and varying in porportion to R (cosine ωt + cosine θ);

generating an electric pulse each time the beam crosses the said seam;

supplying the said pulse to a bistable electronic circuit so as to produce at the output of said circuit a periodic alternating rectangular voltage wave which alternates between two voltage levels in synchronism with each successive pulse;

integrating the said rectangular voltage wave, by electronic means, and thus producing a position error signal which represents the deviation of the rest position of the beam from the seam;

multiplying, by electronic means, the said voltage wave by a periodic voltage varying as the sine ωt and simultaneously multiplying, by other electronic means, the said voltage wave by a periodic voltage varying as the cosine ωt, so as to obtain separate product voltages which represent respectively the cosine and sine of an angle θ formed by the chord between the points of intersection of the rotating beam and the seam, and the first of aforesaid axes;

multiplying, by electronic means, the said position error signal respectively by separate voltages representing the said sine θ and cosine θ so as to obtain the position error components with respect to the aforesaid axes;

multiplying, by electronic means, a voltage which represents a desired tangential velocity for the beam respectively by the separate voltages representing the sine and cosine of the angle θ between the seam and the said axis so as to obtain separate voltages representing the components of the said tangential velocity along each of the said axes;

summing the voltages representing the positional error and the component of the tangential velocity along one of said axes, by electronic means, and summing the voltages representing the positional error and the component of tangential velocity along the second of said axes, by other electronic means, so as to obtain separate control signals and;

feeding the said signals to a pair of electronic servo systems which drive the gun along the two axes so as to cause the gun to move at a fixed tangential velocity along a path parallel to the said seam.

3,993,890

COMBINATORIAL DIGITAL FILTER

Abraham Peled, Pleasantville, N.Y., and Bede Liu, Princeton, N.J., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Sept. 29, 1975, Ser. No. 618,307

Int. Cl.² G06F *15/20, 7/38*

U.S. Cl. 235—152 **20 Claims**

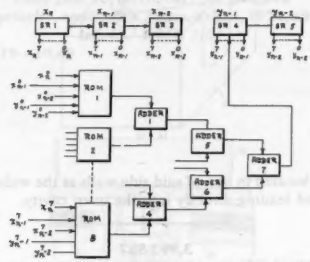
1. A combinatorial digital filter apparatus comprising in combination:

a plurality of read only memory units to receive input data, said plurality of read only memory units providing output data,

a first plurality of shift register units to receive binary data, said first plurality of shift register units utilizing said binary data to respectively provide said plurality of read only memory units with said input data,

a first plurality of adder units connected to said plurality of read only memory units to process the output date therefrom,

a second plurality of adder units connected to said first plurality of adder units to arithmetrically process said output data,



a final adder unit connected to said second plurality of adder units to further process the addition of said output data, and

a second plurality of shift register units connected to said final adder unit to provide intermediate processing of said output data, said second plurality of shift register units having an output and respectively applying said output to said plurality of read only memory units as said input data.

3,993,891

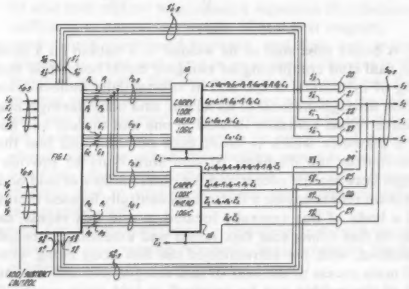
HIGH SPEED PARALLEL DIGITAL ADDER EMPLOYING CONDITIONAL AND LOOK-AHEAD APPROACHES

Gary Randall Beck, El Toro, and Ronald Carlos Quave, Mission Viejo, both of Calif., assignors to Burroughs Corporation, Detroit, Mich.

Filed July 3, 1975, Ser. No. 593,167

Int. Cl.² G06F *7/50*

U.S. Cl. 235—175 **18 Claims**



1. A high speed parallel digital adder for adding two digital operands comprising:

input logic means including a plurality of stages to which said operand digits are applied, each stage receiving a different one or more corresponding pairs of operand digits and being operative in response thereto to produce first and second conditional sum signals for each stage along with corresponding carry output signals for each stage derived solely from the corresponding operand digits applied thereto, said first conditional sum signal being produced assuming the presence of a carry-in to the respective stage and each second condition sum signal being produced assuming the absence of a carry-in to the respective stage;

carry look-ahead logic means responsive to said carry output signals for producing stage look-ahead carry and carry-not signals; and

selection means to which said stage look-ahead carry and carry-not signals are applied along with said first and second conditional sums for selecting particular ones of said conditional sums representing the sum of said operands.

3,993,892

DEVICE FOR TRANSMITTING INFORMATION IN THE FORM OF ELECTRICAL SIGNALS TO AT LEAST ONE MECHANISM FOR DISPLAYING OR PRINTING THIS INFORMATION

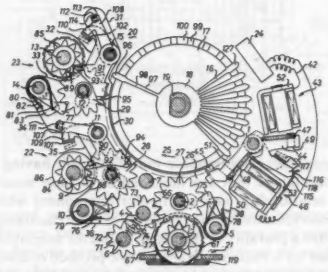
Werner Haug, Kreuzstrasse 42, Langnau, Switzerland

Filed Nov. 3, 1975, Ser. No. 628,245

Claims priority, application Switzerland, Dec. 10, 1974, 16397/74

Int. Cl.² G06C *29/00*; G06K *3/00*

U.S. Cl. 235—61 PG **8 Claims**



1. A device for transmitting information in the form of an electrical signal to at least one mechanism for giving a readout of information, comprising a readout mechanism having at least one symbol wheel carrying symbols on its circumference, first gear means connected to said symbol wheel to drive said symbol wheel to rotate it to a readout position, a drive shaft, a plurality of angularly spaced radially extending actuating members affixed to said drive shaft for rotation therewith and arranged in a first plane, said actuating members being divertible into a different second plane parallel to said first plane, said actuating members being of a number corresponding to the number of readout symbols, guide wall means separating said first and second planes, said first gear means being situated in one of said first and second planes in a position to be engaged by said actuating members upon rotation of said drive shaft to cause rotation of said gear means and indexing of said symbol wheel, a switch arranged in the path of said actuating members so as to selectively divert said actuating members into the second plane, and a relay for sensing the symbol positions of a symbol on said symbol wheel and connnected to said switch to energize said switch.

3,993,893

DATA READER

Manfred Graf, Aldingen, Germany, assignor to J. Hengstler K.G., Aldingen, Germany

Filed Mar. 26, 1975, Ser. No. 562,177

Claims priority, application Germany, Mar. 30, 1974, 2415613

Int. Cl.² G06K *7/14*, *19/06*

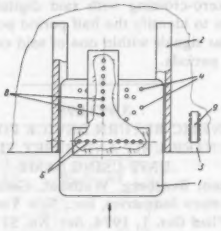
U.S. Cl. 235—61.11 E **9 Claims**

1. Apparatus for reading information from a data carrier containing a plurality of equally spaced parallel data lines, comprising

means defining a path along which the data carrier is movable in a forward direction transversely to the data lines,

line reading means disposed parallel to the data lines on a data carrier for detecting the information carried by a data line when it is in a predetermined position,

one position-detecting element associated with each data line of a data carrier for initiating a position-indicating signal when the associated data line is in a predetermined position, each said position-detecting element being disposed in a column parallel to said path of movement of said data carrier and being spaced apart by a distance



corresponding to the spacing between the data lines on a data carrier,

a plurality of data receiving addresses, each of which is associated with a respective position-detecting element for receiving information represented by one of the data lines of a data carrier, and

an address encoder means for transmitting information read by said line reading means to one of said data receiving addresses in response to a position-indicating signal delivered from the respective one of said position-detecting elements.

3,993,894

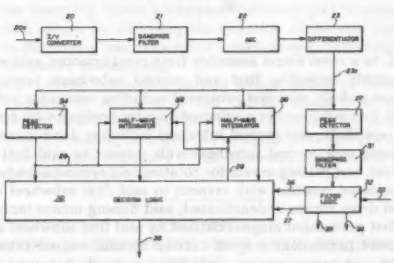
DUAL EDGE DETECTOR FOR BAR CODES

Donny R. Walker, Carrollton, Tex., assignor to Recognition Equipment Incorporated, Dallas, Tex.

Filed Dec. 18, 1975, Ser. No. 642,144

Int. Cl.³ G06K *7/10*; G08C *9/06*

U.S. Cl. 235—61.11 E **8 Claims**



1. A method of reading biphase modulated bar codes by detecting leading and trailing edges of bar signals occurring in an information signal generated by an optical sensor, which comprises:

a. attenuating high and low frequency noise and uniformly shaping said information signal;

b. differentiating said information signal to further remove low frequency noise, and to form a bipolar waveform for both leading and trailing edge detection of said bar signals;

c. separating and integrating positive and negative halfwaves of said bipolar waveform to substantially remove

the effects of intersymbol interferences which may occur from the sensing of adjacent bars in a bar encoded data field;

d. comparing integrals of said positive and said negative half-waves with a reference amplitude to detect one of said bar signals;

e. forming a digital synchronization waveform from said bipolar waveform to define a continuous train of bar time periods;

f. signaling the occurrence of a zero-crossing in a positive to negative transition of said bipolar waveform; and

g. when the amplitude of one of said integrals equals said reference amplitude, correlating the time of occurrence of said zero-crossing with said digital synchronization waveform to identify the half period position of said one of said bar signals within one of said continuous train of bar time periods.

3,993,895

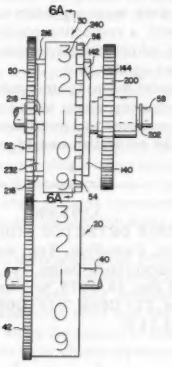
MAGNETIC RETURN DEVICE FOR RESET TIMER/COUNTER UNIT AND RESET TIMER/COUNTER UNIT USING SAME

Max Baermann, Bensberg, Wulfshof, Germany, assignor to Gulf & Western Industries, Inc., New York, N.Y.

Filed Oct. 1, 1974, Ser. No. 511,051

Int. Cl.² G06C *15/42*

U.S. Cl. 235—144 ME **8 Claims**



1. In a reset wheel assembly for a reset counter, said wheel assembly including first and second subwheels journalled about a shaft; said first subwheel including means for holding said first subwheel in a selected angular position with respect to said shaft; said second subwheel including drive means for driving said second subwheel with respect to said first subwheel; and biasing means for rotating said second subwheel to a selected position with respect to said first subwheel when said drive means is deactivated, said biasing means including a first permanent magnet carried by said first subwheel and a second permanent magnet carried by said second subwheel with said permanent magnets being mutually balanced when said second subwheel is in said selected position, the improvement comprising: said first magnet being a first magnetic ring with a first generally cylindrical, radially facing pole surface with first and second opposite polarity magnetic poles extending around said first pole surface and said second permanent magnet being a second magnetic ring with a second generally cylindrical, radially facing pole surface facing said first pole surface having first and second opposite polarity magnetic poles extending around said second pole surface, said poles being in patterns where said poles of said first surface face opposite polarity poles of said second surface when said second subwheel is in said selected position, each of said pole surfaces including a pole terminating portion wherein said first magnetic pole is adjacent to said second magnetic pole and wherein at least one of said poles has an axial pole width greater than the axial width of said first and said second poles at surface positions spaced from said pole terminating portion.

3,993,896

COMPACT MULTIFLASH UNIT HAVING PROTECTIVE COVER COMPONENT WITH INTEGRAL LIGHT CONTROLLING MEANS

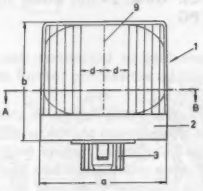
Alfred Wacker, Friedberg, Germany, assignor to Patent-Treuhand-Gesellschaft fur Elektrische Gluhlampen mbH, Munich, Germany

Filed Mar. 21, 1975, Ser. No. 560,463

Claims priority, application Germany, Apr. 4, 1974, 7411807[U]

Int. Cl.² G03B *15/02*

U.S. Cl. 240—1.3 **7 Claims**



1. In a compact photographic multiflash unit having a plurality of flashlamps that are mounted on a base member in operative relationship with a reflector component which defines an individual reflector for each of said flashlamps and thus provides a plurality of flashlamp-reflector assemblies that are enclosed by a radiation-transmissive protective cover that is composed of plastic and is attached to said base member, said protective cover being of such configuration that a side wall portion thereof is disposed in front of each of the flashlamp-reflector assemblies with the inner face of the side wall portion disposed adjacent the associated flashlamp, the improvement comprising a plurality of prismatic-shaped elements that constitute integral parts of each of the respective side wall portions of the protective plastic cover and are arranged in spaced sets with the individual prismatic-shaped elements oriented relative to the associated flashlamp-reflector assembly in a manner such that said prismatic-shaped elements constitute an integral light-controlling structure which produces a light-focusing effect that optically directs the light rays from the fired flashlamps in the direction in which the photograph is being taken, the ratio of the width-to-height dimensions of said multiflash unit being at least 1.

3,993,897

SOLID STATE IMAGING APPARATUS

Hubert K. Burke, Scotia, and Gerald J. Michon, Waterford, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Nov. 26, 1975, Ser. No. 635,703

Int. Cl.² H01J *39/12*

U.S. Cl. 250—211 J **5 Claims**

1. In combination,

a substrate of semiconductor material having a major surface,

a plurality of first conductive plates, each overlying and in insulated relationship to said major surface and forming a first conductor-insulator-semiconductor capacitor with said substrate,

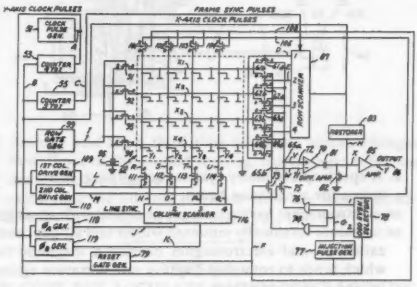
a plurality of second conductive plates, each adjacent a respective first conductive plate to form a plurality of pairs of plates, said pairs of plates being arranged in a matrix of rows and columns, each of said second conduc-

tive plates overlying and in insulated relationship to said major surface and forming a second conductor-insulator-semiconductor capacitor with said substrate, each coupled to a respective first conductor-insulator-semiconductor capacitor,

a plurality of row conductor lines, the first conductive plates in each of said rows connected to a respective row conductor line,

a plurality of column conductor lines, the second conductive plates in each of said columns connected to a respective column conductor line,

a first voltage means for providing a first voltage between said row conductor lines and said substrate to deplete respective first portions of said substrate lying thereunder of majority charge carriers and provide an absolute potential of a first value therein,



a second voltage means for providing a second voltage between said column conductor lines and said substrate to deplete respective second portions of said substrate lying thereunder of majority charge carriers and providing an absolute potential of a second value therein,

means for storing charge in said first portions of said substrate,

first means for reducing said first voltage on each pair of adjacent row conductor lines in sequence to a first level during a respective first period of time to cause said first portions of said substrate associated with said respective pair of row lines to be reduced in absolute potential to a third value less than said second value whereby charge stored in said first portions transfers into respective second portions of said substrate associated with said respective pair of row lines,

second means for reducing on each of said column conductor lines in sequence said second voltage to a second level during a respective second period of time shorter than said first period of time and thereafter reestablishing said second voltage to cause said second portions of said substrate to be reduced in absolute potential to a fourth value less than said third value whereby charge stored in each of said second portions transfers into a respective first portion and back again to said second portion,

each row line being included in two successive pairs of row lines whereby the first voltage thereon is reduced to said first level during an initial first period and also during a successive first period,

means for collapsing said first voltage on each of said row lines for an interval at the end of said initial first period therefor and for simultaneously collapsing the second voltage on all of the column lines during said interval to cause charge in said first portions of the substrate associated with said respective row line to be injected into said substrate,

means for sensing in sequence the signals induced on each of said pair of row lines during the transfer of charge from the first portions to the second portions of said substrate associated with said pair of row lines,

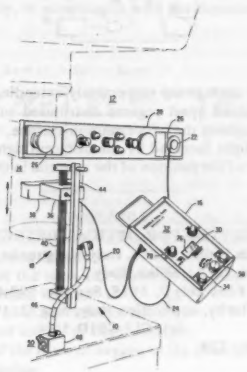
means for obtaining a difference signal for each pair of signals appearing on said pair of row lines.

3,993,898

PRESS BRAKE PERFORMANCE TESTER

Surinder Singh Guliani, Springdale, Ark.; John David Petit, North Perry, and John Francis Sawdy, Madison, both of Ohio, assignors to Babcock & Wilcox Limited, New York, N.Y.

Filed Dec. 17, 1975, Ser. No. 641,860
Int. Cl.² H01J 39/12; G01D 5/34
U.S. Cl. 250—215 **9 Claims**



1. Testing apparatus for determining the stopping time of a movable member after initiation of a stop signal to the driving mechanism of the movable member comprising:

photoelectric means for determining the moving and stationary condition of the movable member and establishing signals indicative thereof including a detector assembly having a light emitter spacedly located from a light detector mountable to the movable member to be movable therewith, and a stationary grid member mounted in the space between the light emitter and light detector of said detector assembly to intermittently prevent light from the emitter from reaching the detector as said detector assembly moves along said stationary grid member;

switch means for detecting the initiation of the stop signal to the driving mechanism and establishing a control signal indicative thereof; and

circuit means responsive to said switch means to initiate counting in response to the control signal from said switch means and responsive to said photoelectric means to stop counting in responsive to signal from said photoelectric means indicative of the stationary condition of the movable member.

3,993,899

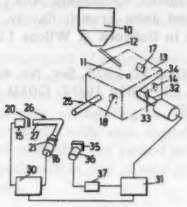
SORTING MACHINE WITH FIBER OPTIC FOCUSING MEANS

Thomas Henry Chapman, Sanderstead, England, assignor to Gunson's Sortex Limited, London, England

Filed Dec. 9, 1974, Ser. No. 531,227
Claims priority, application United Kingdom, Dec. 13, 1973, 57833/73
Int. Cl.² G02B 5/14
U.S. Cl. 250—227 **13 Claims**

2. A light-sensitive sorting machine comprising a plurality of light sensors which are respectively responsive to light of different colours emanating from material moving through a field of view, a block, a multiplicity of optical fibres which extend through said block and adjacent ends of which extend

from a common surface of said block, the opposite ends of the fibres being disposed outwardly of said block in a plurality of separate groups of fibres which respectively illuminate the light sensors responsive to the light of different colours, and focussing means for focussing light onto the common surface,



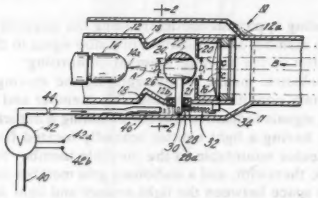
the fibres of each group respectively extending from a multiplicity of spaced apart regions distributed substantially uniformly throughout the said common surface, the ratio of the amounts of light received by the different light sensors being independent of the position of the material in the field of view.

3,993,900

SHUTTER FOR OPTICAL DETECTION

John Kenneth Hulme, Milan, Italy, assignor to Societa Italiana Elettronica S.p.A., Milan, Italy

Filed July 7, 1975, Ser. No. 593,447
Claims priority, application Italy, Aug. 2, 1974, 25906/74
Int. Cl.² G01D *5/34*
U.S. Cl. 250—229 **11 Claims**



1. A shutter mechanism for use in a detector assembly having stationary detector means for producing an output responsive to the presence of radiation emitted from a flame source, said shutter mechanism being positioned at spaced intervals between said source and said detector means and comprising:

a shutter member having a symmetric mass distribution about an axis of rotation and being formed of an opaque material, a central portion of said shutter member having a cylindrical shaped aperture formed therethrough with its longitudinal axis aligned transverse to said axis of rotation;

a stationary opaque mask member having an aperture and being positioned between said source and said shutter member;

said mask and shutter members lying along a path extending between said flame and said detector means;

bias means for normally maintaining said shutter aperture substantially in alignment with said path;

said mask and shutter member apertures, when aligned, cooperating to unblock the path between said radiation source and said detector;

selectively actuatable means for temporarily overcoming said bias means to rotate said shutter member about its axis of rotation towards a test position wherein said aperture is displaced from said path;

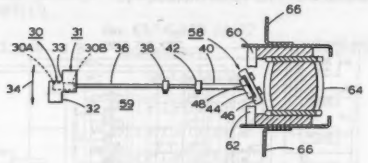
said rotated shutter member cooperating with said mask member to substantially prevent said radiation from reaching said detector means to periodically verify the proper operation of said detector means without disturbing the flame.

3,993,901

RADIATION DETECTING SYSTEM

David Sydney Widmer, Greater Foxes, England, assignor to Pye of Cambridge Ltd., Cambridge, England

Filed Jan. 22, 1975, Ser. No. 543,113
Claims priority, application United Kingdom, Feb. 7, 1974, 5738/74
Int. Cl.² G01J *3/42*
U.S. Cl. 250—232 **6 Claims**



1. A spectrophotometry system, comprising:

a source for a radiation beam;

an electromagnet having a magnetic circuit with an air gap;

an armature torsionally mounted within said air gap, energization of said electromagnet causing a magnetic force which tends to rotatably displace said armature against a torsional restoring force;

an arm having one end thereof secured to said armature so that said arm swings when said armature is rotatably displaced;

an optical element mounted on the other end of said arm to swing therewith for modulating the radiation beam from said source;

means for energizing said electromagnet with a periodic electrical signal having a frequency that is not close to the natural mechanical resonance frequency of said torsionally mounted armature, arm and optical element, or any harmonic or subharmonic thereof, so that said armature, arm and optical element oscillate at said frequency without having the amplitude of oscillation substantially dependent upon said frequency;

means for positioning a sample in the modulated radiation beam;

a radiation detector for detecting modulated radiation coming from the sample; and

processing means for said detected radiation synchronized with said periodic electrical signal energizing said electromagnet.

3,993,902

RADIOACTIVE LOGGING FOR DETERMINING OIL SATURATION IN A RESERVOIR

Charles H. Neuman, Placentia, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Mar. 31, 1975, Ser. No. 563,921
Int. Cl.² G01V *5/00*
U.S. Cl. 250—258 **7 Claims**

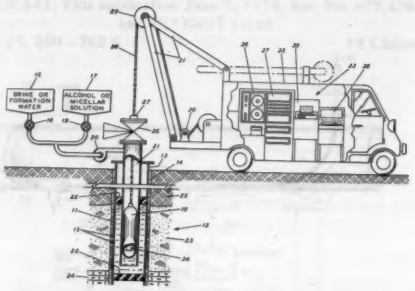
1. A method of measuring the concentration of oil in an earth formation constituting a given depth interval of the region surrounding a well bore, comprising:

a. running, over said given depth interval, a log whose response to the carbon content of said region is substantially linear throughout the range of expectable carbon contents,

b. injecting into said region a solvent capable of replacing substantially all of the previous fluids in the part of said region to which said log is responsive,

c. running said log a second time to obtain signals changed from those of the first running, the changes reflecting the effects of Step (b),

d. injecting brine to replace substantially all of said solvent within the part of said region to which said log is responsive,



e. running said log a third time to obtain signals changed from those of the second running, the changes reflecting the effects of Step (d),

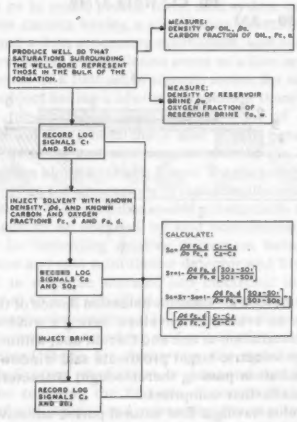
f. calculating the oil concentration from the measured difference in the signals from Steps (a), (c), and (e).

3,993,903

LOW-COST BUT ACCURATE RADIOACTIVE LOGGING FOR DETERMINING GAS SATURATION IN A RESERVOIR

Charles H. Neuman, Placentia, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Mar. 31, 1975, Ser. No. 563,923
Int. Cl.[2] G01V *5/00*
U.S. Cl. 250—258 **7 Claims**


MEASURE: DENSITY OF OIL, ρo CARBON FRACTION OF OIL, Fc, o
PRODUCE WELL SO THAT SATURATIONS SURROUNDING THE WELL BORE REPRESENT THOSE IN THE BULK OF THE FORMATION.
MEASURE: DENSITY OF RESERVOIR BRINE ρw OXYGEN FRACTION OF RESERVOIR BRINE Fo, w
RECORD LOG SIGNALS C1 AND SO1
INJECT SOLVENT WITH KNOWN DENSITY, ρd, AND KNOWN CARBON AND OXYGEN FRACTIONS Fc, d AND Fo, d.
CALCULATE:
RECORD LOG SIGNALS C2 AND SO2
INJECT BRINE
RECORD LOG SIGNALS C3 AND SO3

1. A method of measuring the concentration of gas in an earth formation constituting a given depth interval of a region surrounding a well bore, comprising:

a. running, over said given depth interval, separate first and second logs whose response to the carbon and oxygen contents of said region is substantially linear throughout the range of expectable carbon and oxygen contents, respectively,

b. injecting into said region a solvent capable of replacing substantially all of the previous fluids in the part of said region to which said logs are responsive,

c. running said logs a second time to obtain respective signals changed from those of the first running, the changes reflecting the effects of Step (b),

d. injecting brine to replace substantially all of said solvent within the part of said region to which said logs are responsive,

e. running said logs a third time to obtain signals changed from those of the second running, the changes reflecting the effects of Step (d),

f. calculating gas saturation of said region from respective corresponding measured differences in the signals of said separate first and second logs of Steps (a), (c), and (e), respectively, in accordance with the Equation:

$$Sg = St - So = (1 - Sw) - So =$$

$$\left[1 - \frac{\rho_d F_{o,d}}{\rho_w F_{o,w}}\right] \frac{SO_2 - SO_1}{SO_3 - SO_2} - \left(\frac{\rho_d F_{c,d}}{\rho_o F_{c,d}}\right) \frac{C_1 - C_2}{C_2 - C_3}$$

wherein

C_1, C_2 and C_3 and SO_1, SO_2 and SO_3 refer to separate log responses recorded in Steps (a), (c) and (e) respectively;

ρ_d = density of liquid in the formation after Step (b);

$F_{o,d}$ = ratio of the mass of oxygen to the total mass of the above-specified liquid;

$F_{c,d}$ = ratio of the mass of carbon to the total mass of the above-specified liquid;

ρ_w = density of the formation brine;

ρ_o = density of the oil in the formation;

$F_{o,w}$ = ratio of the mass of oxygen to the over-all mass of the formation brine;

$F_{c,w}$ = ratio of the mass of carbon to the total mass of the oil; and

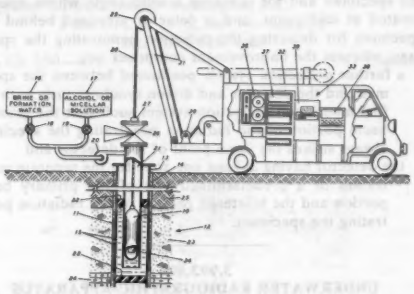
Sg = fraction of the pore volume containing gas.

3,993,904

LOW-COST BUT ACCURATE RADIOACTIVE LOGGING FOR DETERMINING WATER SATURATIONS IN A RESERVOIR

Charles H. Neuman, Placentia, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Filed Mar. 31, 1975, Ser. No. 563,922
Int. Cl.[2] G01V *5/00*
U.S. Cl. 250—258 **14 Claims**



1. A method of measuring the concentration of water in an earth formation constituting a given depth interval of a region surrounding a well bore, comprising:

a. running, over said given depth interval, a log whose response to the oxygen content of said region is substantially linear throughout the range of expectable oxygen contents,

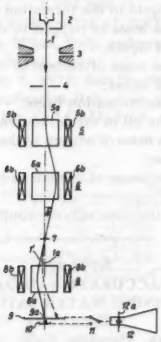
b. injecting into said region a solvent capable of replacing substantially all formation fluids in the part of said region to which said log is responsive,
c. running said log a second time to obtain signals changed from those of the first running, the changes reflecting the effects of Step (b),
d. injecting brine to replace substantially all of said solvent within the part of said region to which said log is responsive,
e. running said log a third time to obtain signals changed from those of the second running, the changes reflecting the effects of Step (d),
f. calculating the water concentration from the measured difference in the signals from Steps (a), (c), and (e).

3,993,905

ELECTRON BEAM SCANNING APPARATUS FOR THE STRUCTURAL ANALYSIS OF SPECIMENS

Gottfried Mollenstedt, Tubingen, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed Oct. 30, 1975, Ser. No. 627,339
Claims priority, application Germany, Aug. 6, 1975, 2535510
Int. Cl.² G01N *23/00*; G21K *7/00*; H01K *37/26*
U.S. Cl. 250—310 **3 Claims**



1. Electron beam scanning apparatus, for the structural analysis of a specimen, of the type having a ray source, a deflection system arranged between the ray source and a specimen for directing the beam always to the same point of the specimen and for scanning a solid angle whose apex is located at said point, and a detector arranged behind the specimen for detecting the radiation penetrating the specimen, wherein the improvement comprises
a further deflection system positioned between the specimen and the detector and driven synchronously with the first-mentioned deflection system such that the primary beam portion of the radiation penetrating the specimen always strikes the same point of the detector and
the detector having at least one zone for the separate registration of a predetermined one of the primary beam portion and the scattered portion of the radiation penetrating the specimen.

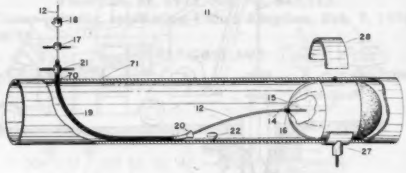
3,993,906

UNDERWATER RADIOGRAPHIC APPARATUS

Paul Nelson English, 2741 Iowa St., Baton Rouge, La. 70802

Filed June 25, 1975, Ser. No. 590,337
Int. Cl.² G03B *41/16*; G01N *23/00*
U.S. Cl. 250—321 **8 Claims**

1. In a device for the underwater radiography of a hollow member containing a liquid and having a small orifice in the sidewall thereof, the improvement therein which comprises the combination of:
a. means of inserting an inflatable bag through the orifice and directing the inflatable bag to a chosen location within the hollow member;
b. means for inflating the inflatable bag, thereby displacing the liquid from the chosen location within the hollow member;



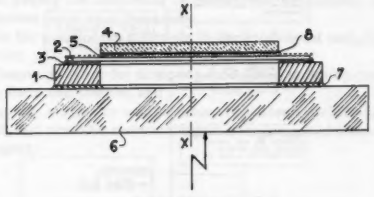
c. penetrating radiation source means securely positioned externally on the side wall of the hollow member so that penetrating radiation emanating from the source will traverse the chosen location within the hollow member; and
d. imaging means securely positioned externally on the side wall of the hollow member so that the chosen location within the hollow member is between the penetrating radiation source means and the imaging means.

3,993,907

CAMERA TUBE WITH A PYRO-ELECTRIC TARGET

Serge Veron, Paris, France, assignor to Thomson-CSF, Paris Cedex, France

Filed Apr. 23, 1975, Ser. No. 570,840
Claims priority, application France, Apr. 26, 1974, 74.14637
Int. Cl.² H01J *31/49*
U.S. Cl. 250—333 **8 Claims**



1. A pyroelectric radiation detection device of the type that comprises an evacuated envelope having a window transparent to said radiation at one end thereof and, within said enevelope, a pyroelectric target proximate said window for receiving the radiation passing therethrough, characterized in that said device further comprises:
an annulus having a first natural period adhesively secured to said window;
a stretched support plate having a second natural period adhesively secured to said annulus, said first natural period being substantially greater than said second natural period and said annulus being at least two orders of magnitude thicker than said support plate; and
means for securing said pyroelectric target to said support plate whereby said detection device is rendered relatively insensitive to microphonic vibration.

3,993,908

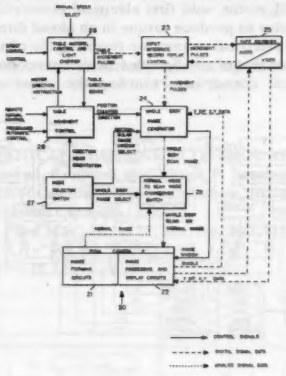
SYSTEM FOR WHOLE BODY IMAGING AND COUNT PROFILING WITH A SCINTILLATION CAMERA

Ervin Kaplan, 2600 Wilmette Ave., Wilmette, Ill. 60091, and Michael B. D. Cooke, 13, Southeast Avenue, Bishopbriggs, Glasgow G64 3AB, Scotland

Division of Ser. No. 372,835, June 22, 1973, Pat. No. 3,839,641. This application June 3, 1974, Ser. No. 475,438

Int. Cl.² G01T *1/166*

U.S. Cl. 250—363 S 19 Claims



1. A system for producing information on the distribution of a source of radiation in an object that can be displayed in image form or in count profile form, said system comprising a scintillation camera having a scintillation detector, a radiation shield and a data processing mechanism; said scintillation camera representing a scintillation event as a first set of coordinates in terms of a first set of signals; means for supporting thereon an object having a source of radiation therein; motor mechanism for providing relative movement of extended linear dimension along both the X and Y axes between said scintillation detector and said support means, the extended linear dimension along both the X and Y axes being substantially greater than the dimensions of said scintillation detector in both the X and Y direction to enable substantially the entire support means to be scanned by said scintillation camera; mechanism for indicating relative movement between said support means and said scintillation detector and for producing a signal in response thereto; and electronic interfacing means coupled to said scintillation detector and to said data processing mechanism and to said movement indicating mechanism for electronically masking said scintillation camera into a predetermined shape for converting the signal from said movement indicating mechanism to a second set of coordinates and for summing the first set of coordinates and the second set of coordinates and converting the sum into a second set of signals and for replacing the first set of signals with the second set of signals, continued relative movement between said scintillation detector and said support means with the object thereon resulting in n sets of signals over extended linear dimensions along both the X and Y axes summed before display to correct non-uniformity, non-linearity and edge distortion in said scintillation detector, whereby the n sets of signals received by said data processing mechanism are displayed in image form or in count profile form.

3,993,909

SUBSTRATE HOLDER FOR ETCHING THIN FILMS

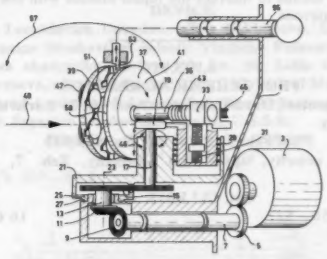
Klaus Drews, Halstenbek, and Jens-Peter Krumme, Hamburg, both of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 450,742, March 13, 1974, abandoned. This application Dec. 24, 1975, Ser. No. 644,069

Claims priority, application Germany, Mar. 16, 1973, 2313096

Int. Cl.² H01J *37/00*

U.S. Cl. 250—492 A 3 Claims



1. In a substrate holder of the type wherein a rotating turntable is adapted for carrying a plurality of substrates past an etching ion beam, the ion beam impacting the substrate surfaces at a gradually varying radius from the rotation axis of the turntable, the rotation speed of the turntable being proportional to the gradually varying radius, the improvement comprising:

a rotatable support for each substrate journalled in the turntable so that the surface of the substrate to be etched may be rotated within its own plane, the rotation axis of each support being parallel to the rotation axis of the turntable; and

means for rotating each support by a fixed amount during each rotation of the turntable.

3,993,910

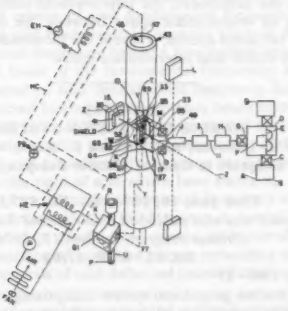
LIQUID LITHIUM TARGET AS A HIGH INTENSITY, HIGH ENERGY NEUTRON SOURCE

Don M. Parkin, Los Alamos, N. Mex., and Norman D. Dudey, Glen Ellyn, Ill., assignors to The United States of America as represented by the United States Energy Research & Development Administration, Washington, D.C.

Filed Dec. 2, 1975, Ser. No. 636,865

Int. Cl.² G21G *4/02*

U.S. Cl. 250—499 12 Claims



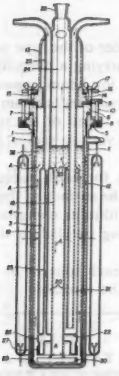
1. Target means for charging particles, comprising:

a. first source means for producing a beam of deuterons;
b. longitudinally extending container means having sides terminating in closed ends for transporting the beam of deuterons along an axis toward one end of the container means; and
c. second source means of a flowing liquid lithium stream having a nozzle defining a narrow vent in one side of the container means adjacent the one end thereof for converting the flowing liquid lithium stream into a falling, gushing, liquid lithium jet that flows by gravity as a sheet-shaped web along and across the one end of the container means in a direction transverse to the axis of the container means to interact the liquid lithium with the beam of deuterons.

3,993,911
PHOTOCHEMICAL REACTOR

Alfred Graentzel, Durmersheimerstrasse 98, 75 Karlsruhe 21, Germany

Filed Feb. 5, 1974, Ser. No. 439,933
Claims priority, application Germany, Feb. 7, 1973, 2305761
Int. Cl.[2] B01K *1/00*
U.S. Cl. 250—527 **16 Claims**



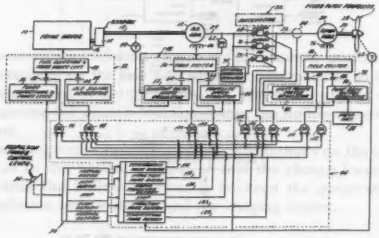
1. In a photochemical reactor including a reaction vessel which is transparent to radiation and which receives the substances to be irradiated, a UV-radiation source, and luminescent material which transforms the UV-light of the radiation source into a specific wavelength characteristic of the luminescent material and which effects the photochemical reactions of the substances, the improvement comprising means defining an intermediate space between the reaction vessel and the radiation source, wherein the luminescent material is disposed within said intermediate space.

3,993,912
MARINE PROPULSION SYSTEM

Thomas E. Ekstrom, and Richard L. Koch, both of Scotia, N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed June 10, 1974, Ser. No. 477,597
Disclosure was also published under second Trial Voluntary Protest Program on Feb. 17, 1976
Int. Cl.[2] B60L *11/02*
U.S. Cl. 290—17 **1 Claim**

1. A marine propulsion system comprising:
a power propulsion lever manually movable between and within a normal ahead range, a slow ahead range, a slow astern range, and a normal astern range;
a gas turbine engine including means for controlling the output thereof between an idle setting and a maximum power setting response to the position of said power propulsion lever, said gas turbine being in said idle setting when said lever is positioned in said slow ahead and slow astern ranges;
an AC generator, said generator connected to and driven by said gas turbine and including a field winding;
a synchronous motor electrically connected to the output of said generator and including a field winding;
a fixed pitch marine propeller connected to an output shaft of said motor;
a braking resistor;
switchgear means for selectively providing a first, second and third electrical connection between said generator and said motor, said first electrical connection causing said motor to produce torque in an ahead direction, said second electrical connection reversing the phase connection from that of said first electrical connection, said third electrical connection reversing the phase connection



from that of said first electrical connection and connecting said braking resistor in series between said generator and said motor; and
means for controlling the excitation current in said generator field winding, the excitation current in said motor field windings and said switchgear means in response to the setting of said power control lever and selected parameters of propulsion system operation whereby when said lever is in said normal ahead and astern range said motor is operated synchronously, when said lever is in said slow ahead and astern range said motor is operated in a controlled manner asynchronously, and when said lever is rapidly moved from the normal ahead range to the normal astern range said switchgear means assumes said third connection and the field current is removed from said generator winding and applied to said motor winding so as to brake said propeller before torque is applied in the astern direction by operating said motor as a generator and absorbing the generated energy using the wiring of the propulsion system and said generator.

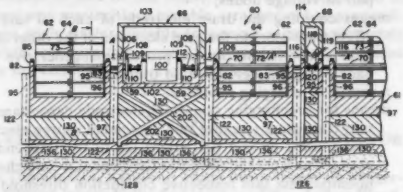
3,993,913
TIDEWATER POWER SYSTEM

Smith V. Dickman, 1807 27th St., West, Bradenton, Fla. 33505

Filed Mar. 28, 1975, Ser. No. 562,840
Int. Cl.[2] F03B *13/10*
U.S. Cl. 290—53 **23 Claims**

1. A tidewater power system, comprising:
a dam constructed in a body of water subject to tidal flow separating a tidal reservoir between a shoreline and said dam from said body of water;
a plurality of water wheel assemblies mounted on said dam, each including a water wheel, means directing water flow to said water wheel from one of said reservoir and said body of water, and means mounting said water wheel for rotation about a horizontal axis positioned above the high tide level of said body of water with the bottom of said

water wheel being positioned at substantially low tide level of said body of water, said water wheel being so mounted that said water flow is substantially restricted to flow through said water wheel; and



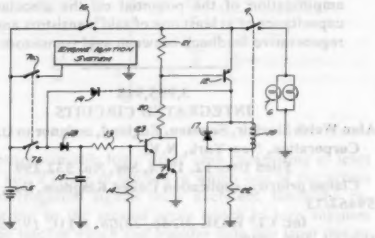
brake means for selectively precluding rotation of said water wheel to control said water flow.

3,993,914

MOTOR VEHICLE HEADLIGHT CONTROL APPARATUS

John H. Conrad, Brosserd, and Joseph P. Seemann, Ste. Julienne, both of Canada, assignors to Unican Security Systems, Ltd., Montreal, Canada

Filed Mar. 31, 1975, Ser. No. 563,349
Int. Cl.² B60Q *1/06, 1/08*
U.S. Cl. 307—10 LS **4 Claims**



1. Apparatus for controlling lights on a vehicle that has an engine, an ignition switch which is in an "on" position when the engine is running and can be moved to an "off" position to stop the engine, and a battery which provides a source of electrical power for the lights, said apparatus being characterized by:

A. a relay having
   1. a winding and
   2. switching contacts that are normally open but are closed when the winding is energized;

B. means connecting said switching contacts in series with the battery and the lights to provide a light power circuit through which the lights can be energized from the battery when the switching contacts are closed;

C. a current valving device of the type having a control terminal and a pair of other terminals, and which allows current to flow between said other terminals only when current flows between its control terminal and one of said other terminals;

D. means connecting said other terminals of the current valving device in a series circuit that comprises the battery and the winding of the relay, so that the relay winding is energized whenever current flows in a circuit in which the control terminal is connected;

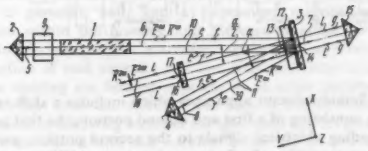
E. time delay circuit means connected with the control terminal and with the battery through the ignition switch, to provide for current flow between the control terminal and said one other terminal at all times that the ignition switch is in its "on" position and for a predetermined time after the ignition switch is moved to its "off" position; and

F. means comprising a diode connected between the ignition switch and the winding of the relay, in bypassing relation to the current valving device and the time delay circuit means, to enable the lights to be energized when the ignition switch is in its "on" position notwithstanding any failure of said current valving device or said time delay circuit means.

3,993,915

COHERENT SECOND HARMONIC GENERATION DEVICE

Boris Leonidovich Davydov, ulitsa Nakhimova, 17, kv. 63, Fryazino Moskovskoi oblasti; Vladislav Fedorovich Zolin, ulitsa akademika Pavlova 40, kv. 36; Lidia Georgievna Koreneva, ulitsa Udaltsova, 4, kv. 287, both of Moscow, and Evgeny Anatolievich Lavrovsky, ulitsa Vokzalnaya, 19, kv. 153, Fryazino Moskovskoi oblasti,, U.S.S.R.

Filed Dec. 8, 1975, Ser. No. 638,940
Int. Cl.² H02M *5/04*
U.S. Cl. 307—88.3 **6 Claims**

1. A device for coherent optical and infrared second harmonic generation, comprising:

a. an active laser element acting as a source of a fundamental frequency beam; a longitudinal axis of said active laser element; said fundamental frequency beam travelling along said longitudinal axis of said active laser element;

b. a Q - switch unit ensuring giant pulsing of said active laser element, said Q-switch unit being positioned to the left of said active laser element; a longitudinal axis of said Q-switch unit, said longitudinal axis of said Q-switch unit coinciding with said longitudinal axis of said active laser element;

c. a fundamental frequency cavity formed by at least three mirrors totally reflecting said fundamental frequency beam;

d. a first mirror of said fundamental frequency cavity; a working surface of said first mirror; a normal to said working surface of said first mirror; said first mirror being positioned to the left of said Q-switch; said normal to said working surface of said first mirror coinciding with said longitudinal axis of said active laser element;

e. a second mirror of said fundamental frequency cavity deflecting said fundamental frequency beam; a deflected fundamental frequency beam; a longitudinal axis of said deflected beam of the fundamental frequency; an intersection zone of said fundamental frequency beam and said deflected fundamental frequency beam formed with the help of said second mirror; an external synchronism angle characterizing said intersection zone; said second mirror of said fundamental frequency cavity being positioned to the right of said active laser element;

f. a third mirror of said fundamental frequency cavity; a working surface of said third mirror; a normal to said working surface of said third mirror; said normal to said working surface of said third mirror coinciding with said longitudinal axis of said deflected beam of the fundamental frequency;

g. a nonlinear crystal generating the second harmonic under noncollinear synchronism conditions and transparent for the fundamental frequency and the second harmonic,

said crystal being cut so that its shape and attitude in relation to the reference axes ensure compliance with the conditions of noncollinear synchronism; a second harmonic beam travelling along the bisectrix of said exterior synchronism angle; said nonlinear crystal being positioned in said zone of intersection of said fundamental frequency beam coming out of said active laser element and said deflected fundamental frequency beam.

3,993,916

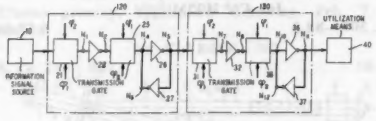
FUNCTIONALLY STATIC TYPE SEMICONDUCTOR SHIFT REGISTER WITH HALF DYNAMIC-HALF STATIC STAGES

John Alexander Copeland, III, Watchung, and Robert Harold Krambeck, Warren, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed May 21, 1975, Ser. No. 579,390

Int. Cl.² G11C *19/28*

U.S. Cl. 307—221 C **11 Claims**



1. Semiconductor apparatus which includes a shift register stage consisting of a first and second portion, the first portion of feeding electrical signals to the second portion, said first portion consisting of a first complementary MOS inverter and a first externally controllable complementary MOS transmission gate for receiving input electrical signals and for feeding the resulting electrical output signals of said first gate to said first inverter, said second portion consisting of a second complementary MOS inverter and a second externally controllable complementary MOS transmission gate for feeding electrical output thereof to an input node of said second inverter, said first inverter having an output node for feeding electrical output signals of said first inverter to said second gate, said second portion further including a third complementary MOS inverter, said second inverter having an output node for feeding back electrical output signals from said second inverter through said third inverter to the said input node of the second inverter.

3,993,917

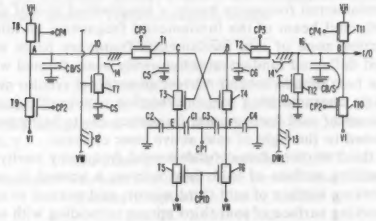
PARAMETER INDEPENDENT FET SENSE AMPLIFIER

Howard Leo Kalter, Colchester, Vt., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed May 29, 1975, Ser. No. 581,984

Int. Cl.² H03K *5/20, 5/18, 3/286;* G11C *11/40*

U.S. Cl. 307—235 F **26 Claims**



1. A signal sensing amplifier circuit comprising:

first and second field effect transistors, each having a source, drain and gate electrode, said first and second transistors having respective conduction threshold voltages, each of said source and drain electrodes having an associated capacitance;

first and second pairs of voltage nodes;

means for coupling said drain electrodes to said first pair of voltage nodes and said source electrodes to said second pair of voltage nodes;

means coupling the drain electrode of each of said field effect transistors to the gate electrode of the other of said field effect transistors for providing regenerative feedback of signals between said transistors;

a source of charging potential;

means for precharging said drain electrode capacitances of said transistors to cause said associated source electrode capacitance of said first transistor to be independently charged to a potential substantially equal to said charging potential less said respective conduction threshold voltage and to cause said associated source electrode capacitance of said second transistor to be independently charged to a potential substantially equal to said charging potential less said respective conduction threshold voltage;

means for coupling a differential input signal to one of said pairs of voltage nodes;

first and second capacitors, each having first and second electrodes, said first electrodes being coupled to one of said pairs of voltage nodes; and

drive means coupled to said second electrodes of said capacitors for simultaneously driving the potentials of said second electrodes of said capacitors in a direction which tends to increase the gate drive of both of said transistors at a substantially constant rate to cause charge transfer amplification of the potential on the associated drain capacitance of at least one of said transistors and to allow regenerative feedback between said transistors.

3,993,918

INTEGRATED CIRCUITS

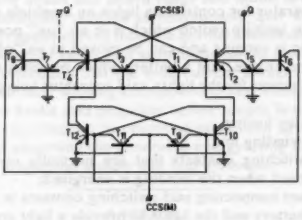
Alan Welsh Sinclair, Sawston, England, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Dec. 12, 1974, Ser. No. 532,259

Claims priority, application United Kingdom, Dec. 21, 1973, 59462/73

Int. Cl.² H03K *3/286, 23/08;* G11C *19/28*

U.S. Cl. 307—279 **23 Claims**



1. An electrical circuit comprising at least one master/slave bistable arrangement suitable for triggering from a single input of clock pulses, said at least one master/slave bistable arrangement comprising:

a master bistable comprising a cross-coupled pair of transistors;

biasing means responsive to a clock pulse source for supplying to said cross-coupled master bistable transistors a primary bias current of normal level when ther is no clock pulse and a bias current of reduced level during a clock pulse;

a slave bistable comprising a cross-coupled pair of transistors;

a current source for supplying a fixed biasing current to said cross-coupled slave bistable transistors, said slave bistable

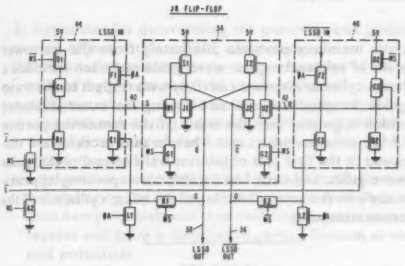
assuming a conduction state determined by the conduction state of said master bistable only when said master bistable is biased at a normal level; and

means responsive to the conduction state of said slave bistable for supplying a secondary bias current to the master bistable of one of the master/slave bistables of said at least one master/slave bistable arrangement to precondition such master bistable to assume a conduction state when returning to a normal bias level that is determined by the conduction state of said slave bistable.

3,993,919
PROGRAMMABLE LATCH AND OTHER CIRCUITS FOR LOGIC ARRAYS

Dennis Thomas Cox, Kingston; Justin Bruce Damerell, Saugerties; Gilbert Joseph Kelly, Red Hook, and Roy Arthur Wood, Saugerties, all of N.Y., assignors to IBM Corporation, Armonk, N.Y.

Filed June 27, 1975, Ser. No. 591,208
Int. Cl.² H03K *3/286, 3/353, 19/08, 19/20*
U.S. Cl. 307—279 **5 Claims**



1. In a programmable logic array chip comprising at least two arrays and a string of latches in which one of the arrays receives interrogation signals from decoders, feeds the responses thereto to the second array which in turn supplies inputs to the latches which can transfer data bits from one to another, new latches each latch comprising:

a bi stable circuit having:

two three terminal semiconductor devices each with a control terminal and two controlled terminals with the control terminal of each semiconductor coupled to a controlled terminal of the other three terminal semiconductor device,

two load devices each for coupling the controlled terminals of three terminal semiconductor devices in series with a source of potential so that when one of the three terminal semiconductor devices is conducting state the other is in an off state;

two, two input AND gates each with its output coupled to a different one of the control terminals of the three terminal semiconductor devices so that application of two inputs to either AND gates will determine which one of the three terminal semiconductor devices is in the off state;

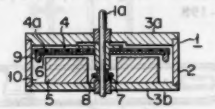
data transfer means for coupling the outputs of each of AND gates of each latch to the control terminal of one of the three terminal semiconductor devices of the preceding latch in the string of latches to enable changing of the state of each latch with the information stored in the preceding latch independently of the inputs to the AND gates; and,

selective coupling means coupling inputs of the AND gates to different outputs of the second array, the bi stable circuit and clocking pulses in different configurations in different latches in the string whereby the string of latches contains different types of latches.

3,993,920
CORELESS MOTOR

Masaaki Sato, Hachioji, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed July 14, 1975, Ser. No. 595,398
Claims priority, application Japan, July 13, 1974, 49-83083[U]; July 18, 1974, 49-85239[U]; July 18, 1974, 49-85240[U]; July 31, 1974, 49-91510[U]; Dec. 24, 1974, 50-3291[U]
Int. Cl.² H02K *7/04*
U.S. Cl. 310—66 **12 Claims**

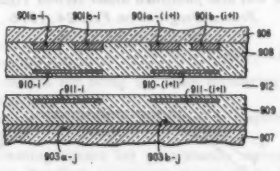


1. A coreless motor comprisng a motor housing having a bearing, a rotor mounted within the housing, rotatably supported within the bearing and having a plurality of coil units attached on a rotor substrate, said plurality of coil units constituting a pancake coil, and a permanent magnet stator mounted within the housing and disposed opposite to the rotor, in which said stator is arranged opposite to an effective coil section of said pancake coil and thus said rotor and an annular spacing are formed opposite to an outer peripheral portion other than said effective coil section of said rotor so that a balance adjusting member for said rotor and an electrical part associated with said coreless motor can be provided within said annular spacing.

3,993,921
PLASMA DISPLAY PANEL HAVING INTEGRAL ADDRESSING MEANS

Frank Neville Hosband Robinson, Rumson, N.J., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Sept. 23, 1974, Ser. No. 508,097
Int. Cl.² H01J *61/067, 61/30, 61/54*
U.S. Cl. 313—188 **4 Claims**



1. A plasma display panel comprising

first and second substantially parallel planar dielectric layers,

a volume of an ionizable gas between said dielectric layers,

first and second orthogonal pluralities of conductors disposed on opposite sides of said volume and substantially in respective first and second conductor planes, each of said conductor planes being substantially parallel to said first and second dielectric layers, selected ones of each of said first plurality of conductors being electrically interconnected to form respective subsets of conductors, each of a plurality of cylindrical volumes with generatrix perpendicular to said dielectric layers and including at least two conductors from said first plurality of conductors and at least one conductor from said second plurality of conductors, adjacent portions of said first and second dielectric layers, and the gas contained therebetween constituting a separately addressable plasma cell, and

means at each cell for averaging a potential applied to said gas by said conductors from said first plurality of conductors.

3,993,922

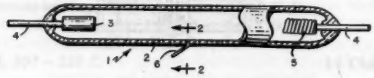
ARC DISCHARGE LAMP WITH INTEGRAL TRIGGER ELECTRODE

Robert J. Cosco, Amesbury; John A. Pappas, Winthrop, and Roger T. Hebert, Peabody, all of Mass., assignors to GTE Sylvania Incorporated, Danvers, Mass.

Filed Jan. 5, 1976, Ser. No. 646,506

Int. Cl.² H01J *61/30, 61/35, 61/54*

U.S. Cl. 313—198 **6 Claims**



1. A high voltage, arc discharge flash tube comprising:
an elongate light transmitting envelope including a wall enclosing an arc discharge volume and having a rare gas sealed therein,
arc supporting electrodes spaced apart inside the envelope, and
a trigger conductor for applying an electrical pulse initiating discharge of the arc,
wherein the trigger conductor partially penetrates the envelope wall to an extent outside the arc volume so as to distribute the electrical field of the pulse along the arc discharge volume.

3,993,923

COATING FOR X-RAY TUBE ROTARY ANODE SURFACE REMOTE FROM THE ELECTRON TARGET AREA

Frederik Magendans, and Gerhardus Albertus te Raa, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Sept. 9, 1974, Ser. No. 504,056

Claims priority, application Netherlands, Sept. 20, 1973, 7312945

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 24, 1976

Int. Cl.² H01J *35/08*

U.S. Cl. 313—330 **10 Claims**

1. A rotary anode for an X-ray tube having an electron target area and a surface remote therefrom, comprising on the surface remote from the electron target area a metal oxide coating comprising at least 94 percent by weight aluminum oxide and at least 2 percent by weight titanium dioxide.

3,993,924

DELAY LINE FOR TRAVELING WAVE TUBES

Fritz Hanf, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Germany

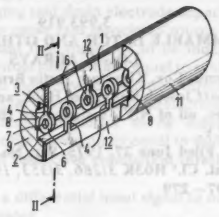
Filed Jan. 23, 1975, Ser. No. 543,527

Claims priority, application Germany, Feb. 14, 1974, 2407075

Int. Cl.² H01J *25/34*

U.S. Cl. 315—3.5 **2 Claims**

1. In a delay line for traveling wave tubes of the type comprising interior walls defining a rectangular wave guide and having cross members which protrude perpendicularly into the interior of the wave guide alternately from two facing interior walls of the wave guide, the improvement therein comprising:
a pair of recesses in a pair of facing walls extending longitudinally of the wave guide, each of the recesses being provided in the area of the distal ends of the cross members, said wave guide having a first pair of interior walls and a second pair of narrower interior walls, wherein the



cross members protrude alternately from the narrower walls of said rectangular wave guide and each includes a beam cylinder disposed coaxially with respect to the wave guide longitudinal axis and having an outer diameter which is greater than the width of the remaining portion of the cross member, and wherein said recesses are disposed in the first pair of interior walls of said rectangular wave guide and each has a width corresponding approximately to the outer diameter of the beam cylinders of the cross members.

3,993,925

ELECTRON BEAM COLLECTOR FOR TRANSIT TIME TUBES

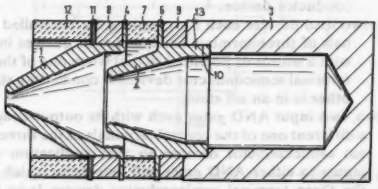
Eugen Achter, Munich; Wilhelm Bibracher, Otterloh Gem Brunntal, and Wolf Wiehler, Neubiberg, all of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Germany

Filed Oct. 6, 1975, Ser. No. 619,933

Claims priority, application Germany, Oct. 21, 1974, 2449890

Int. Cl.² H01J *23/02*

U.S. Cl. 315—5.38 **12 Claims**

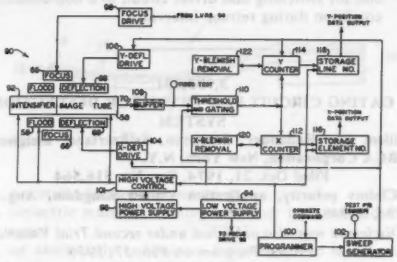


1. An electron beam collector for transit time tubes, in particular traveling wave tubes, comprising:
a plurality of hollow metal electrodes for receiving an electron beam;
a plurality of hollow insulating spacers, at least one of said insulating spacers located between and firmly and directly connecting adjacent metal electrodes; and
a plurality of sleeves, each of said sleeves having a thermal coefficient of expansion which is small compared to that of said electrodes and matched to that of said spacers, and each of said sleeves circumscribing and embracing a respective electrode.

3,993,926
STORAGE TUBE MOVING TARGET DETECTOR

Bernard C. Rauckhorst, Akron, and Harry O. Pfeiffer, N. Canton, both of Ohio, assignors to Goodyear Aerospace Corporation, Akron, Ohio

Filed Oct. 7, 1974, Ser. No. 512,659
Int. Cl.² H01J 31/26
U.S. Cl. 315—10 6 Claims



1. Apparatus for determining the presence and position of a moving object within a field, comprising:

first means for emitting electrons as a function of the amplitude of light from the field incident thereto;

a storage mesh having a dielectric coating for receiving said electrons and storing a distributive charge thereon indicative of time related displacements of moving light levels within the field;

second means connected to said storage mesh for sequentially altering the biasing of said storage mesh between at least two potentials and thus enabling the storage mesh to receive and store a distributive charge thereon at each of said potentials;

third means for controllably scanning said second means and operative to create output signals as a function of the charge distribution on said second means, said third means comprising an aperture plate and deflection coils interposed between said storage mesh and said aperture plate; and

circuit means connected to the deflection coils for controlling and regulating the path of electrons passing from the storage mesh to the aperture plate and position monitoring means connected to the circuit means for monitoring the position on the storage mesh from which the electrons passing to the aperture plate are being emitted.

3,993,927
ELECTRODELESS LIGHT SOURCE

Paul Osborne Haugsjaa, Acton; Robert James Regan, Needham, and William Henry McNeill, Carlisle, all of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

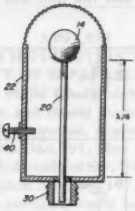
Filed Apr. 21, 1975, Ser. No. 570,112
Int. Cl.² H05B 41/24
U.S. Cl. 315—39 2 Claims

1. A light source including:

a. a source of power at a high frequency,

b. an electrodeless lamp having an envelope made of a light transmitting substance, the envelop enclosing a votaile fill material which produces a light emitting discharge upon excitation, and

c. a termination fixture coupled to the source, the fixture having an inner conductor and an outer conductor disposed around the inner conductor, the lamp being coupled across the end of the conductors to form the termination for the conductors, the conductors of the fixture having dimensions effective to produce a characteristic impedance which matches the real impedance of the lamp in a discharge condition to the impedance of the coupled high frequency source thereby substantially eliminating the reflection of high frequency power from the fixture when the lamp is in the discharge condition, the length of the conductors being such as to place the lamp one quarter wavelength away from the conductor ends

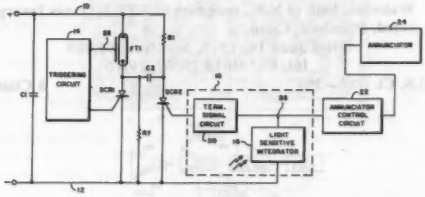


which are coupled to the source and the characteristic impedance of the fixture being equal to $\sqrt{Z_S \cdot R_L}$, where Z_S equals the output impedance of the coupled high frequency source, and R_L equals the impedance of the lamp in the discharge condition.

3,993,928
EXTENDED RANGE CORRECT EXPOSURE ANNUNCIATOR

Dennis J. Wilwerding, Littleton, Colo., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Dec. 19, 1975, Ser. No. 642,281
Int. Cl.³ H05B 41/32
U.S. Cl. 315—241 P 20 Claims



1. Electronic flash apparatus comprising:

flash producing means;

triggering means for firing the flash producing means to produce light;

first means for providing a first signal in response to light received;

light terminating means for prematurely terminating the light from the flash producing means if the first signal attains a first predetermined level;

second means for causing a second signal to be produced if the first signal attains a second predetermined level; and

annunciator means responsive to the second signal.

3,993,929
AUTOMATIC CORRECT EXPOSURE INDICATOR

John D. Dick, Denver, and Dennis J. Wilwerding, Littleton, both of Colo., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Dec. 19, 1975, Ser. No. 642,283
Int. Cl.³ H05B 41/32
U.S. Cl. 315—241 P 17 Claims

11. Annunciator means for use with electronic flash apparatus, the annunciator means comprising:

switching means having a control electrode and first and second main current carrying electrodes, the switching means for switching from a non-conductive to a conductive state in response to a control signal;

indicator means connected in an energization circuit with the first and second main current carrying electrodes, the indicator means requiring an indicator voltage greater than a maintaining voltage in order to operate;

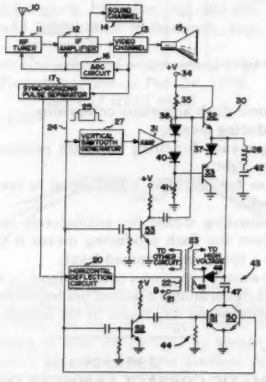
voltage limiting means for limiting the voltage across the indicator means and the first and second main current carrying electrodes to a predetermined value greater than the maintaining voltage; and

turn-off capacitor means for increasing, after the indicator means is turned on, the potential across the first and second main current carrying electrodes until the indicator voltage is less than the maintaining voltage.

3,993,930
VERTICAL DEFLECTION SYSTEM

Martin Fischman, Seneca Falls, and Jesse H. L'Hommedieu, Waterloo, both of N.Y., assignors to GTE Sylvania Incorporated, Stamford, Conn.

Filed June 16, 1975, Ser. No. 586,889
Int. Cl.² H01J 29/70, 29/76
U.S. Cl. 315—397 **8 Claims**



1. A vertical deflection system for a cathode ray tube having a vertical deflection winding associated therewith comprising:

a sawtooth signal generator;

a driver circuit connected to said sawtooth signal generator and to said vertical deflection winding for providing a trace scanning signal to said vertical deflection winding for causing electron beam deflection in said cathode ray tube;

a trace voltage source connected to said driver circuit for providing an energizing voltage thereto for supplying power to said vertical deflection winding during trace intervals;

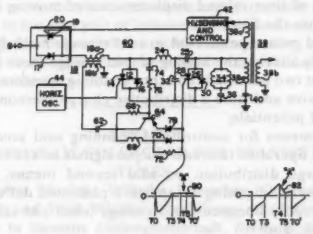
a retrace voltage source independent of said trace voltage source; switching means connecting said retrace voltage source in circuit with said vertical deflection winding for providing a voltage to said vertical deflection winding only during retrace intervals of sufficient magnitude for effecting vertical retrace of the electron beam deflection in said cathode ray tube; and

means connecting said switching means to said driver circuit for switching said driver circuit to a non-conducting condition during retrace intervals.

3,993,931
GATING CIRCUIT FOR THYRISTOR DEFLECTION SYSTEM

Willem den Hollander, Schlieren, Switzerland, assignor to RCA Corporation, New York, N.Y.

Filed Oct. 21, 1974, Ser. No. 516,564
Claims priority, application United Kingdom, Aug. 22, 1974, 36948/74
Disclosure was also published under second Trial Voluntary Protest Program on Feb. 17, 1976
Int. Cl.² H01J 29/70
U.S. Cl. 315—408 **9 Claims**



9. In a deflection system a gating circuit comprising:

a first switching means coupled to a deflection winding for supplying a first quantity of energy to said deflection winding during a trace interval of each deflection cycle;

a commutating means coupled to said deflection winding for supplying a second quantity of energy to said deflection winding during a commutating interval of each deflection cycle;

said commutating means including a second switching means for providing switching to initiate said commutating interval;

first conducting means coupled to said commutating means and to said first switching means for providing a first polarity portion of gating signals developed by said commutating means to said first switching means during said trace interval to enable conduction of said first switching means;

said first conducting means including reactive means for peaking said gating signals to enable conduction of said first switching means at a predetermined point in said trace interval; and

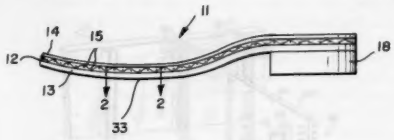
second conducting means coupled in parallel with said first conducting means and to said second switching means for providing a second polarity portion of said gating signals to said first switching means during conduction of said second switching means to enable the turn off of said first switching means during said commutating interval.

3,993,932

ANTISTATIC FOOTWEAR

John W. Weigl, 534 Wahlmont Road, West Webster, N.Y. 14580

Filed Jan. 16, 1976, Ser. No. 649,590
Int. Cl.² A61N 1/14; H05F 3/00
U.S. Cl. 317—2 B 23 Claims



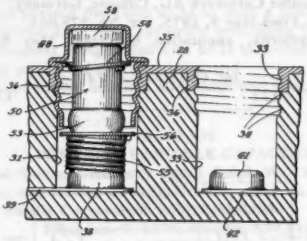
1. Antistatic footwear comprising:
a. dielectric material forming a bottom layer of said footwear;
b. an electrically conductive material above said bottom layer;
c. said conductive material extending to the outer periphery of said bottom layer; and
d. said conductive material having a discharge edge exposed to ambient atmosphere in the region of said outer periphery of said bottom layer.

3,993,933

ELECTRIC OVERVOLTAGE GAS ARRESTER WITH METALLIC SHORTING MECHANISM

Gysbert L. Menninga, Highland Park, Ill., assignor to CEAC of Illinois, Inc., Rosemont, Ill.

Filed Feb. 20, 1975, Ser. No. 551,360
Int. Cl.² H02H 9/06
U.S. Cl. 317—62 5 Claims



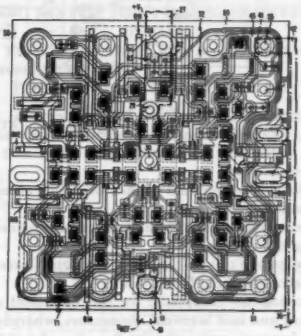
1. In an electric overvoltage arrester of the character described, the combination with a metal housing member substantially cylindrical in shape and having a closed top end and an open bottom skirt portion, of a surge voltage gas tube having cylindrical ends of metal separated by a sealed ceramic bulbous part, said gas tube being carried by the housing in a manner whereby one metal end of the gas tube depends below the open skirt portion of the same, a coil spring located on said depending end of the gas tube, a fusible element interposed between the other end of the gas tube and the closed top of the housing member, the coil spring being effective before expansion to yieldingly maintain the other end of the gas tube in contact with the fusible element and to maintain the fusible element in contact with the closed top of the housing member, a metal ring also located on said depending end of the gas tube and being positioned between the bulbous portion and the top convolution of the coil spring, said ring being normally spaced below the skirt portion due to the thickness of the fusible element and having a diameter at least equal to the skirt portion, whereby upon melting of the fusible element by an overvoltage current the coil spring upon expansion can be effective to cause the ring to move up into contact with the skirt portion of the metal housing thereby shorting the gas tube, and whereby the coil spring will thus function as a conductive path for conducting said overvoltage current to the metal housing.

3,993,934

INTEGRATED CIRCUIT STRUCTURE HAVING A PLURALITY OF SEPARABLE CIRCUITS

Theodore H. Baker; Majid Ghafghaichi; Richard C. Stevens, all of Poughkeepsie, and Daniel Tuman, Beacon, all of N.Y., assignors to IBM Corporation, Armonk, N.Y.

Division of Ser. No. 364,791, May 29, 1973, Pat. No. 3,801,905, which is a division of Ser. No. 129,500, March 30, 1971. This application Nov. 30, 1973, Ser. No. 420,472
Disclosure was also published under second Trial Voluntary Protest Program on Feb. 24, 1976
Int. Cl.² H01L 19/00
U.S. Cl. 317—101 A 4 Claims



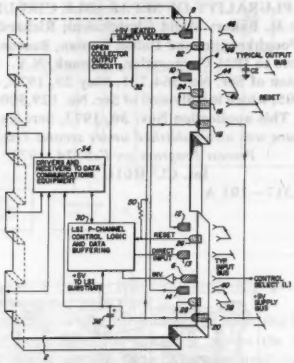
1. An integrated circuit structure comprising
a plurality of separable circuits, at least one of said separable circuits being functional and at least one of said separable circuits being defective, each of said separable circuits comprising an interconnected plurality of regions of different conductivity types, and each of said separable circuits requiring the application of two voltage levels in order to be operable,
at least one voltage supply for applying one of said voltage levels connected to all of said separable circuits by interconnections common to all of said separable circuits,
an additional voltage supply providing the other of said voltage levels,
receiving and distributing means in each of said separable circuits for receiving and distributing said other voltage level, said receiving and distributing means in each circuit being independent of each other,
connecting means connecting said additional voltage supply to said receiving and distributing means of only the functional separable circuits to thereby provide said other voltage level required in order for said functional separable circuits to be operable, and
at least one common region of one-type conductivity extending between all of said separable circuits and connected to said additional voltage supply,
said receiving and distributing means in each of said defective separable circuits not connected to said additional voltage supply being free of short-circuits to said common region, and thereby completely electrically isolated from said common region.

3,993,935

PRINTED CIRCUIT BOARD CONNECTION

Lewis A. Phillips, Rockville, and George J. Leiby, Mount Airy, both of Md., assignors to Xerox Corporation, Stamford, Conn.

Filed Dec. 16, 1974, Ser. No. 533,396
Int. Cl.² H05K *1/04*
U.S. Cl. 317—101 C **1 Claim**



1. A printed circuit board having electrical components thereon, means for applying electrical signals to said board and for extracting electrical signals from said board said means comprising:

a. a plurality of terminal connectors along at least one edge of said board,

b. at least one of said terminal connectors recessed from the edge of said board,

c. at least one of said terminal connectors extending to the edge of said board,

d. a connector receptacle for receiving said edge of said board and said terminal connectors, whereby said terminal connector extending to the edge of said board makes contact with said connector receptacle prior to contact between said connector receptacle and said recessed terminal connector, and

e. a signal path extending from said receptacle at one end of said board edge, onto said board and along said board to the opposite end thereof and through a recessed terminal connector to said receptacle to prevent signal connection when the board is inserted into the receptacle in a skewed manner.

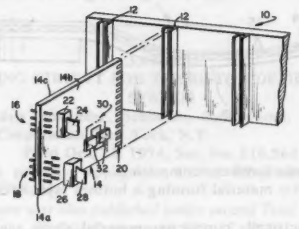
3,993,936

CONNECTOR ARRANGEMENT FOR PRINTED CIRCUIT CARD

Robert M. Meade, Wassaic; Thomas Kwei, Wappingers Falls; Daniel R. Sappe, Fishkill; Robert G. Kinkade, Poughkeepsie; Stanley R. Andersen, Hopewell Junction, and Eddie L. Wagner, Beacon, all of N.Y., assignors to Intermen Corporation, Wappingers Falls, N.Y.

Filed Aug. 29, 1975, Ser. No. 609,091
Int. Cl.³ H05K *5/00*
U.S. Cl. 317—101 C **3 Claims**

1. A printed circuit card having a printed circuit on at least one side thereof and a plurality of electrical components mounted thereon and interconnected by the printed circuit, a plurality of means electrically connected to said printed circuit and disposed along one edge of the card for connecting the card to an electrical system, a plurality of connector elements electrically connected to said printed circuit and arranged in three parallel rows, all of the connector elements in the middle row extending through the card and being adapted to mate with corresponding elements in an electrical connector disposed on either side of the card, all of the connector elements in each of the two outside rows being adapted to mate with corresponding elements in an electrical connector disposed on a respective one of the two sides of the card, and means in the circuit card for electrically connecting each connector element in one of the two outside rows to the same-



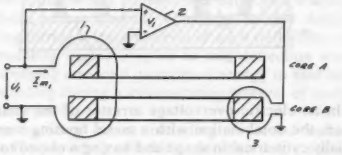
positioned connector element in the other outside row, whereby the same electrical connector having two rows of corresponding elements may be disposed on either side of the card for mating with said middle row of connector elements and a respective one of the two outside rows of connector elements for establishing an identical electrical connection to said printed circuit.

3,993,937

CIRCUIT FOR INCREASING THE IMPEDANCE OF A WINDING WOUND AROUND TWO CORES MADE OF SOFT MAGNETIC MATERIAL

Bruno Fuhrmann, Braunschweig, Germany, assignor to Felten & Guilleaume Carlswerk AG, Cologne, Germany

Filed May 9, 1975, Ser. No. 579,865
Claims priority, application Germany, May 9, 1974, 2422436
Int. Cl.³ H01F *27/24*
U.S. Cl. 317—123 **13 Claims**



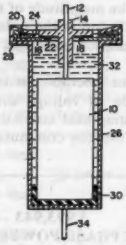
1. A high-impedance low-ohmic-resistance inductor comprising, in combination, a first magnetic core and a second magnetic core; a principal winding wound around both cores, the principal winding having N turns; a magnetizing winding having ν_1.N turns wound around only one of the magnetic cores; and a high input impedance decoupling amplifier of gain ν_1, the amplifier having its input connected to receive the terminal voltage of the principal winding, the amplifier having its output connected to the magnetizing winding for energizing the latter in dependence upon the terminal voltage of the principal winding, the amplifier gain factor ν_1 being positive if the winding directions of the principal winding and magnetizing winding are the same and negative if the winding directions are opposite.

3,993,938

ELECTRICAL COMPONENT HERMETIC ENCLOSURE

Jan A. Marien, Raleigh, N.C., and David R. Steinberg, Medfield, Mass., assignors to Corning Glass Works, Corning, N.Y.

Division of Ser. No. 489,460, July 17, 1974, Pat. No. 3,922,773. This application June 30, 1975, Ser. No. 591,609
Int. Cl.² H01G 9/00; H01J 5/00; B01J 17/00
U.S. Cl. 317—230 12 Claims



1. An enclosure comprising

a silver container open at one end, said container having a unitary outwardly protruding flange at said open end,

an electrical component having a metallic lead extending from one end thereof, said component being disposed within said container, said lead extending from within said container to the exterior thereof,

a glass bead sealed to said lead along its length intermediate the ends thereof,

a metallic member having an aperture therein, said member being fused to said glass bead at the surface of the aperture bordering portion thereof,

a silver ring disposed on said surface of said metallic member, the peripheral portion of said metallic member being folded over in contact with a portion of said silver ring and pressed thereinto so as to form a compression seal therebetween, said outwardly protruding flange of said container being folded over so as to contact the remaining portion of said silver ring, and

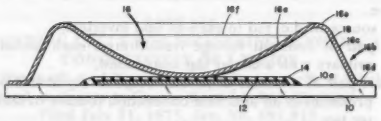
a hermetic seal between said flange and said silver ring.

3,993,939

PRESSURE VARIABLE CAPACITOR

Michael Slavin, Gloucester Point; Ralph W. Carp, Newport News, and George T. Bata, Grafton, all of Va., assignors to The Bendix Corporation, Southfield, Mich.

Filed Jan. 7, 1975, Ser. No. 539,212
Int. Cl.² H01G 7/00
U.S. Cl. 317—246 10 Claims



1. A fluid pressure variable capacitor comprising:

an electrically nonconductive substrate having a supporting surface;

an electrode comprising an electrically conductive film affixed to a portion of said supporting surface;

an electrically conductive diaphragm having a thin flexible active section which includes a central area; said active section being least stiff to forces perpendicular to said active section at said central area, said active section being increasingly stiffer as the distance along said diaphragm from said central area increases, said active section being relatively fixed at the outer extremity thereof with respect to forces perpendicular thereto, the periphery of said diaphragm being hermetically sealed to said supporting surface so that said active section overlies said electrode, said diaphragm and said electrode comprising the plates of said pressure variable capacitor; and,

a dielectric film disposed between said diaphragm and said electrode;

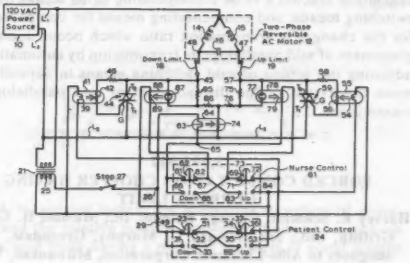
said capacitor being useful for producing a capacity related to difference of pressure across said diaphragm at least in a predetermined pressure difference range, said active section being in contact with said electrode through said dielectric film at said central area at the low end of said range and rolling into increasingly greater area of contact with said electrode through said dielectric film as the pressure difference across said diaphragm increases, the area of contact of said diaphragm with said electrode through said dielectric film at the high end of said range being at least several magnitudes greater than said central area and wherein said diaphragm, when flat, is relatively close to said electrode.

3,993,940

LATCHING SYSTEM FOR TWO-PHASE REVERSIBLE MOTOR

Joseph A. Volk, Jr., Florissant, Mo., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Dec. 26, 1974, Ser. No. 536,498
Int. Cl.² H02P 1/42
U.S. Cl. 318—207 B 12 Claims



1. A latching system for maintaining a two-phase reversible AC induction motor rotating selectively in either direction, where the motor includes, in delta connection, first and second field windings and a phase shift capacitor, comprising:

an AC power source for providing an AC voltage of predetermined magnitude;

first energizing means for applying said AC voltage from said power source to the first field winding to initiate rotation of the motor in one direction;

first holding means responsive to the operation of said first energizing means and to the voltage developed across the capacitor, when the motor begins to rotate in said one direction, for maintaining the application of said AC voltage to the first field winding to effect continued motor rotation;

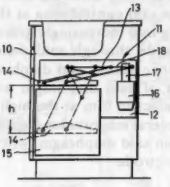
second energizing means for applying said AC voltage from said power source to the second field winding to initiate rotation of the motor in the opposite direction;

and second holding means responsive to the operation of said second energizing means and to the voltage developed across the capacitor, when the motor begins to rotate in said opposite direction, for maintaining the application of said AC voltage to the second field winding to effect continued motor rotation.

3,993,941
PARALLELOGRAM TRANSMISSION USED FOR GENERATING A PRESSING FORCE, PARTICULARLY IN A HOUSEHOLD REFUSE COMPACTOR

Rolf Mayer, Giengen, Germany, assignor to Bosch-Siemens Hausgerate GmbH, Munich, Germany

Filed May 21, 1975, Ser. No. 579,501
Claims priority, application Germany, May 24, 1974, 2425245
Int. Cl.² H02P 3/06
U.S. Cl. 318—264 **8 Claims**

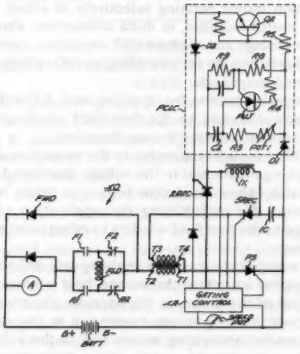


1. In an arrangement for generating and causing a pressing member to exert a pressing force, in combination, an electric drive motor; a parallelogram transmission connected to said pressing member for transmitting pressing force thereto; displacing means connecting said motor to said parallelogram transmission and operative for effecting displacement of said parallelogram transmission by transmitting thereto force from said motor; adjustable-setting switching means operative for terminating operation of said motor when the output force of said motor reaches a value corresponding to the setting of said switching means; and compensating means for compensating for the changes in transmission ratio which occur upon displacement of said parallelogram transmission by automatically adjusting the setting of said switching means in dependence upon the extent of the displacement of said parallelogram transmission.

3,993,942
FORCED COMMUTATION CHOPPER HAVING CURRENT LIMIT

Harvey E. Schmidt, Chicago Heights, Ill.; Michael H. Grace, Griffith, Ind., and Howard G. Murphy, Greendale, Wis., assignors to Allis-Chalmers Corporation, Milwaukee, Wis.

Filed Sept. 11, 1975, Ser. No. 612,537
Int. Cl.² H02P 7/06
U.S. Cl. 318—317 **4 Claims**



1. In a forced commutation chopper circuit for controlling the speed of a DC motor, the combination of

a main SCR in series with said motor and being switchable periodically from a nonconductive to a conductive state in which it carries the load current supplied to said motor,

commutation means connected in shunt with said main SCR for commutating said main SCR off upon command and comprising a commutation SCR poled in the same direction as said main SCR and a commutation capacitor in series with said commutation SCR,

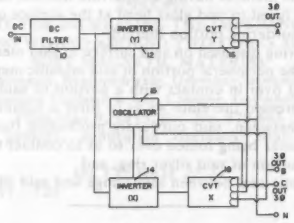
charging means for charging said commutation capacitor during the on-time of said main SCR to a voltage which is a function of the magnitude of the load current carried by said main SCR and in the polarity tending to forward bias said commutation SCR and reverse bias said main SCR, and

current limit means operable in response to a predetermined magnitude of voltage across said commutation capacitor for gating said commutation SCR to the conductive state to thereby commutate said main SCR off.

3,993,943
THREE PHASE POWER CIRCUIT

David R. Bratton, Dublin; Jeffrey M. Powell, Columbus, and Garry A. Reichle, Worthington, all of Ohio, assignors to Solid State Controls Inc., Columbus, Ohio

Filed May 1, 1975, Ser. No. 573,520
Int. Cl.² H02M 7/44
U.S. Cl. 321—5 **10 Claims**



1. A three phase power circuit comprising a pair of inverter circuits each operable to convert a d.c. voltage to a square wave,

a source of d.c. fed to each of said inverters,

a pair of constant voltage transformers each including a primary with a center tap connection,

said pair of inverters connected respectively to said pair of primaries in an alternate connection relative to said center tap;

said constant voltage transformers each also including a secondary winding, one of said secondary windings having a center tap and the other of said secondary windings having a tap in order of one-third voltage magnitude;

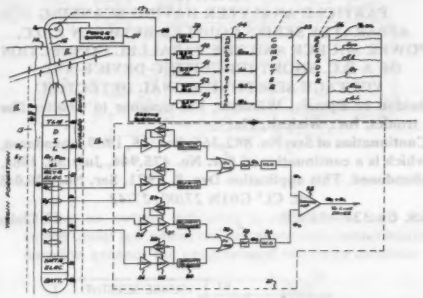
the extreme ends of one of said secondary windings having said center tap providing a first and second output and one end of the other of said secondary windings providing a third output, said one-third tap on the other of said secondary windings providing a neutral connection, the center tap on the one secondary winding and the other end of the other secondary winding being connected.

3,993,944

MOVABLE OIL MEASUREMENT COMBINING DUAL RADIO FREQUENCY INDUCTION AND DUAL INDUCTION LATEROLOG MEASUREMENTS

Richard A. Meador; Percy T. Cox, and Larry W. Thompson, all of Houston, Tex., assignors to Texaco Inc., New York, N.Y.

Filed Dec. 22, 1975, Ser. No. 643,421
Int. Cl.[2] G01V 3/18, 3/10
U.S. Cl. 324—6 20 Claims



1. A method for determining the electromagnetic properties of earth formations in the vicinity of a well bore hole, the earth formations being invaded by conductive drilling fluid to form an invaded zone to some depth of invasion, comprising the steps of:

determining by the use of conventional induction and resistivity well logs the resistance R_{xo} of the invaded zone, the resistance R_t, of the uninvaded formation, and the depth of invasion d_i, as a function of depth in the well bore;

measuring between a first spaced pair of locations in the well bore the relative phase shift of electromagnetic waves at a radio frequency in the range of 10–60 megahertz at a first relatively shallow radial depth of investigation primarily affected by the invaded zone and generating signals θ_x representative thereof as a function of bore hole depth;

measuring between a second spaced pair of locations in the well bore the relative phase shift of electromagnetic waves at a radio frequency in the range of 10–60 megahertz at a second relatively deeper radial depth of investigation affected primarily by the uninvaded formation and generating signals θ_L representative thereof as a function of bore hole depth; and

for each measured R_{xo}, R_t and d_i, combining the signals θ_x and θ_L according to a predetermined relationship to derive indications of ϵ_{xo}, the dielectric constant of the invaded zone, and ϵ_t, the dielectric constant of the uninvaded formation as a function of bore hole depth.

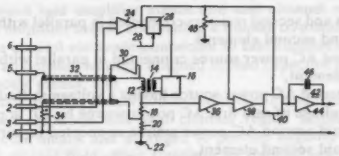
3,993,945

MEASURING CELLS FOR MEASURING ELECTRICAL CONDUCTIVITY OF LIQUIDS

Denis Warmoth, and Kenneth James Porter, both of Hitchin, England, assignors to George Kent Limited, England

Filed July 21, 1975, Ser. No. 597,915
Claims priority, application United Kingdom, Aug. 2, 1974, 34210/74
Int. Cl.[2] G01N 27/42
U.S. Cl. 324—30 B 13 Claims

1. A measuring cell of the kind set forth for measuring electrical conductivity of liquids, wherein there are provided electrodes of co-axial form, namely, a first and fourth electrode which constitute current electrodes for connection to a controllable a.c. current supply, a second and third electrode between the first and the fourth electrodes constituting voltage electrodes adapted for connection to a high input impedance amplifier means provided with means for employing the output of the amplifier means to control the a.c. current supply to maintain sensibly constant the voltage at the voltage electrodes, characterised by a fifth electrode of annular form co-axial with the first and fourth electrodes, and means including a buffer amplifier connecting the fifth electrode to the first electrode and presenting a high impedance to the first electrode and a low impedance to the fifth electrode and located on the side of the first electrode remote from the fourth and voltage electrodes.

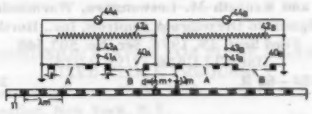


3,993,946

APPARATUS FOR MEASURING THE DIRECTION AND RELATIVE POSITION BETWEEN A BODY AND A PICK-UP USING A MAGNETORESISTIVE PICK UP

Yoshimi Makino, Fujisawa, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Dec. 4, 1974, Ser. No. 529,403
Claims priority, application Japan, Dec. 12, 1973, 48-138987
Int. Cl.[2] G01R 33/00
U.S. Cl. 324—34 D 5 Claims



1. A measuring system for measuring direction of movement and the relative position between a body and a pick-up means, said body having a plurality magnets of equal lengths

$$\frac{\lambda m}{2}$$

formed thereon with adjacent magnets opposite orientated, comprising:

said pick-up means including first and second magnetoresistance elements spaced from each other a predetermined distance

$$\left(\frac{1}{2}m+\frac{1}{8}\right)\lambda m$$

where m is an integer or zero and positioned close to said body, each of said magnetoresistance elements comprising first and second magnetoresistance stripe groups formed of ferromagnetic material, each of said stripe groups comprising an electrical conductor with a plurality of parallel sections with the first end of the first parallel section being an input and the second end connected to the adjacent second end of the second parallel section and the first end of the second parallel section connected to the first end of the third parallel section and so on to form a stripe group and the second end of the last parallel section furnishing an output, said first and second groups electrically connected in series with each other and

spaced from each other by a distance

$$\frac{\lambda m}{2},$$

first and second resistors connected in parallel with said first and second elements,

a first AC power source connected in parallel with said first element,

a second AC power source having a voltage shifted from the voltage of said first AC power source by 90° in phase and said second AC power source connected in parallel with said second element,

a first one of a first pair of output terminals connected at the junction point between said first and second stripe groups of said first element,

a second one of said first pair of output terminals connected to an intermediate point on said first resistor,

a first one of a second pair of output terminals connected at the junction between said first and second stripe groups of said second element,

a second one of said second pair of output terminals connected to an intermediate point on said second resistor, and

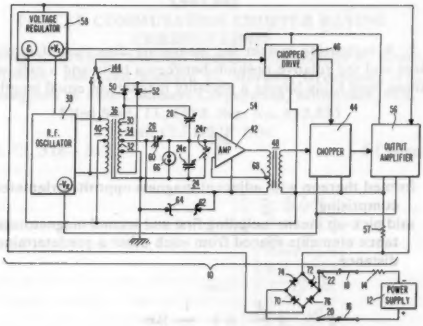
means for subtracting the outputs of said first and second pairs of output terminals to produce an output indicative of the direction and amount of movement between said body and said pick-up.

3,993,947

ADMITTANCE MEASURING SYSTEM FOR MONITORING THE CONDITION OF MATERIALS

Frederick L. Maltby, Jenkintown; L. Jonathan Kramer, Devon, and Kenneth M. Loewenstern, Warminster, all of Pa., assignors to Drexelbrook Controls, Inc., Horsham, Pa.

Filed Sept. 19, 1974, Ser. No. 507,540
Int. Cl.² G01R *11/52, 27/26*
U.S. Cl. 324—60 R **28 Claims**



1. In a two-wire transmitter system comprising a power supply and a load at one location and a two-wire transmitter at another location interconnected by a pair of transmission lines carrying a variable signaling current in a signaling range having a minimum current of substantially 4 milliamps and powered solely by said power supply, the improvement residing in said two-wire transmitter comprising:

an admittance sensing probe including a probe electrode adapted to detect the admittance of materials for monitoring the condition of the materials;

an RF signal generator;

a bridge network coupled to said RF signal generator, said bridge network including the admittance detected by said probe such that the unbalance of the network corresponds to the condition of the materials being monitored, said RF signal generator applying a voltage of less than the $\sqrt{2}V$ rms across the admittance detected where V is the voltage across the two-wire transmitter; and

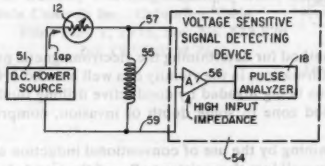
output means coupled to said bridge network for changing the current flow through the transmission lines in said signaling range in response to the unbalance of the bridge network so as to represent the condition of the materials.

3,993,948

PARTICLE ANALYZER HAVING SCANNING APPARATUS SERIES COUPLED BETWEEN A D.C. POWER SOURCE AND THE PARALLEL CONNECTION OF A D.C. SHORT-CIRCUITING DEVICE AND A VOLTAGE SENSITIVE SIGNAL DETECTOR

Sheldon L. Epstein, Wilmette, Ill., assignor to Coulter Electronics, Inc., Hialeah, Fla.

Continuation of Ser. No. 882,366, Dec. 15, 1969, abandoned, which is a continuation of Ser. No. 475,944, July 30, 1965, abandoned. This application Dec. 8, 1971, Ser. No. 206,045
Int. Cl.² G01N *27/00, 27/42*
U.S. Cl. 324—71 CP **20 Claims**



1. An apparatus for studying the physical properties of particles in a liquid suspension, the liquid suspension being separated into two bodies, electrode means in each body, an insulating partition between the bodies having an aperture defining a path therein for enabling the passage of the suspension between the bodies, the passage of a single particle through the path resulting in a displacement of the suspension in the path, electric detecting means electrically coupled with the suspension in said path, means for establishing an electric current to pass through the suspension in said path, the electrical properties of the particles and of the suspension being sufficiently different such that the passage of particles in said path will produce a train of electric voltage signals for detection by said detecting means, the improvement comprising: circuit means which couples said path, detecting means, and electric current establishing means of the apparatus in such a manner that the current in said path is made to vary inversely proportional to slow changes of resistivity of the aperture path with voltage remaining constant; yet, under particle signal frequency conditions, the aperture current remains constant and the changes in aperture resistance due to the presence of particles causes the generation of detectable voltage signals.

3,993,949

METHOD AND APPARATUS FOR DETECTING NON-PARALLEL REED SWITCH CONTACTS

Douglas J. Magno, 7460 Seward St., Niles, Ill. 60648, and Frank Bing, Jr., 258 W. Alexander, Chicago, Ill. 60616

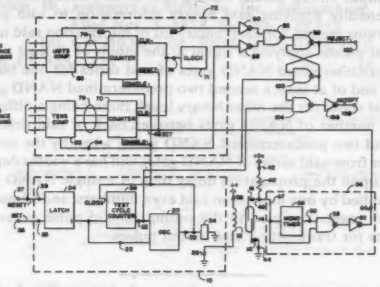
Filed Mar. 27, 1975, Ser. No. 563,005
Int. Cl.² G01R *31/02*
U.S. Cl. 324—28 R **8 Claims**

1. The method of testing reed switch contacts, comprising the steps of:

providing an ample flow of operating current through the operating winding of a reed switch under test;

measuring the duration of each contact bounce when the contacts are open during a specified testing interval after the initial closure of the reed switch;

comparing each measured contact bounce duration with a digitally programmed reference corresponding to an acceptable bounce duration; and



providing an output indicating a rejection of said reed switch under test whenever any measured contact bounce duration exceeds the programmed reference duration.

3,993,950

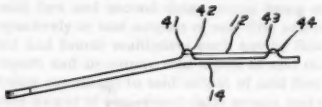
CARBON FIBER ELECTROMETER FOR DOSIMETER

Harley V. Piltingsrud, 522 Grand Ave., Dayton, Ohio 45405

Filed June 6, 1975, Ser. No. 584,567

Int. Cl.³ G01R *5/32*

U.S. Cl. 324—109 **2 Claims**



1. An electrometer for a dosimeter comprising:

a. an electrically conductive electrometer frame having bendable tabs;

b. an approximately seven micron polyacrylonitrile homopolymer yarn fiber carbonized to provide a flexible conductive carbon fiber; and

c. the said carbon fiber attached to the said frame by the said bendable tabs.

3,993,951

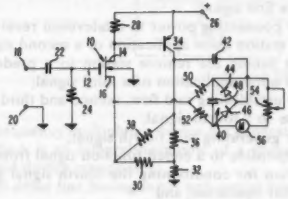
ALTERNATING CURRENT METER CIRCUIT

Sander Leman Knanishu, Tappan, N.Y., assignor to RCA Corporation, New York, N.Y.

Continuation of Ser. No. 331,590, Feb. 12, 1973, abandoned. This application Aug. 30, 1974, Ser. No. 501,981

Int. Cl.³ G01R *19/22, 1/30*

U.S. Cl. 324—119 **1 Claim**



1. An alternating current meter circuit comprising:

a field-effect transistor having a gate and a channel region,

input terminal means coupled to said gate for supplying said gate with an alternating signal,

amplifier means coupled to said channel region for amplifying the alternating signal at the channel region of said field-effect transistor,

detector means including a coupling capacitor connected between said amplifier means and said channel region, said amplifier means comprising a bipolar transistor having a control electrode connected to said channel region and an output electrode coupled by said capacitor to said detector means, and

resistance dividing means connected between said transistor output electrode and said channel region across said detector means and arranged to provide negative feedback to said field-effect transistor to stabilize said field-effect transistor and amplifier means,

said dividing means including first and second resistance means serially connected between said output electrode and said input terminal means, a third resistance means connected between said output electrode and said channel region, and a fourth resistance means connected between said channel region and the junction between said first and second resistance means, said third resistance means having a value tending to isolate said channel region from said output electrode, said first and second resistance means having a value less than said third resistance value to form the load resistance for said bipolar transistor, the ratio of said third and fourth resistance means having a value tending to stabilize the output of said amplifier means, the value of said second and fourth resistance means having a value tending to stabilize said field-effect transistor,

said detector means and said dividing means providing a separate, different signal fed back from said amplifier means output electrode to said channel region.

3,993,952

TRANSMISSION SYSTEM FOR PULSE SIGNALS OF FIXED CLOCK FREQUENCY

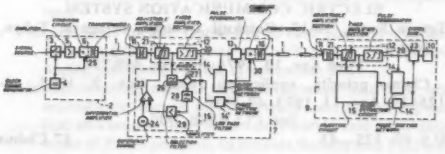
Engel Roza, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed June 11, 1975, Ser. No. 586,061

Claims priority, application Netherlands, June 20, 1974, 7408243

Int. Cl.³ H04B *3/10*

U.S. Cl. 325—13 **5 Claims**



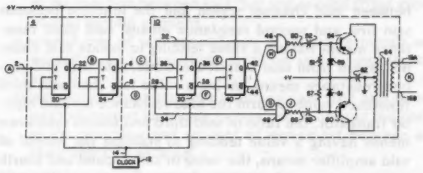
1. Transmission system for pulse signals of fixed clock frequency comprising a transmitter, a receiver and a plurality of repeaters located in a transmission path, the receiver and the repeaters each being provided with an input circuit and with an equalizing amplifier which is connected thereto and comprises a fixed section for equalizing the nominal transfer characteristic of the preceding transmission path and an adjustable section with associated adjusting circuit for automatically equalizing deviations from the said nominal transfer characteristic, the equalizing amplifier being connected to a pulse regenerator and to a clock extraction circuit for obtaining the clock frequency for controlling the pulse regenerator, an output circuit being connected to the pulse regenerator, characterized in that the transmitter includes a combining circuit in which the pulse signals are combined with a pilot signal synchronized with the clock frequency, and the adjusting circuit in the receiver and in each repeater is provided with a

selection filter coupled to the input circuit and serving to select the received pilot signal, which in a mixer stage is mixed with a local pilot signal derived from the clock extraction circuit, the mixing product, selected by means of a lowpass filter being applied via an amplifier as an adjusting signal to the adjustable section of the equalizing amplifier, the output circuit of each repeater including a combining circuit in which the pulse signals regenerated in the pulse regenerator are combined with the local pilot signal.

3,993,953
APPARATUS AND METHOD FOR DIGITALLY GENERATING A MODIFIED DUOBINARY SIGNAL

Adam Lender, Palo Alto, and Henry H. Olszanski, Belmont, both of Calif., assignors to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

Filed Oct. 17, 1975, Ser. No. 623,292
Int. Cl.[2] H03K *13/24*
U.S. Cl. 325—38 A **10 Claims**



1. A method of processing a binary pulse train having a first level and a second level to obtain a modified duobinary signal consisting of the steps of:

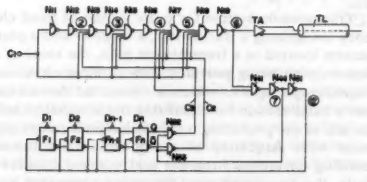
digitally transforming the binary pulse train into an altered binary pulse train wherein each bit is correlated with the second preceding bit; and

digitally converting the transformed binary pulse train into a pseudo-ternary digital waveform, having extreme levels representing a first signal level of said binary pulse train and a center level representing the second signal level of said binary pulse train, the correlating sequence of signal levels establishing a fixed-pattern relationship between pairs of extreme level signals of the pseudo-ternary waveform.

3,993,954
ELECTRIC COMMUNICATION SYSTEM

Tetuya Sugai, 50-17, Gotokuji 1-chome, Setagaya, Tokyo, Japan

Filed Apr. 10, 1974, Ser. No. 459,718
Claims priority, application Japan, Nov. 9, 1973, 48-125439; Apr. 11, 1973, 48-40401
Int. Cl.[2] H04B *7/00*
U.S. Cl. 325—43 **17 Claims**

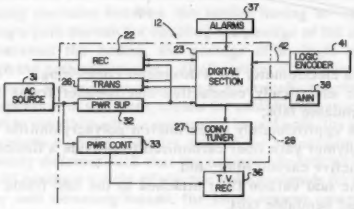


1. An electrical communication system for transmitting binary information by utilizing a train of width modulated pulses as the transmission signal comprising, a transmission means for converting the binary information to pulses of different widths and transmitting them, and a receiving means for receiving said pulses of different widths and decoding them, characterized in that said transmission means includes pulse generator means including at least one series of interconnected NAND gates in the form of an integrated circuit, an input circuit means coupled to said pulse generator means, said input circuit means storing said binary information and sequentially applying said binary information to said pulse generator means, for each binary bit of information said input circuit means applying a signal to the inputs of at least a first two predetermined NAND gates of said series for one binary level and of at least a second two predetermined NAND gates of said series for the other binary level, there being a different even number of NAND gates between each of said first and second two predetermined NAND gates, whereby the output pulses from said series of NAND gates will have widths dependent upon the propagation delay time of a single NAND gate multiplied by one more than said even numbers, and an output circuit means coupled to the output of said pulse generator means for transmitting said output pulses.

3,993,955
METHOD OF AND APPARATUS FOR ESTABLISHING EMERGENCY COMMUNICATIONS IN A TWO-WAY CABLE TELEVISION SYSTEM

Brian E. Belcher, Dallas, and John G. Cambell, Irving, both of Tex., assignors to TOCOM, Inc., Dallas, Tex.

Filed Apr. 25, 1975, Ser. No. 571,536
Int. Cl.[2] H04B *1/06*
U.S. Cl. 325—308 **8 Claims**



3. An apparatus for establishing emergency communications between a master station and a remote station in a two-way cable television system, which comprises:

annunciator means at the remote station;

means for activating said annunciator means upon application of a first signal;

means for connecting power to a television receiver at the remote station upon application of a second signal;

means for tuning the remote station to a predetermined channel upon application of a third signal;

means for establishing said first, second and third signals in response to a fourth signal;

means for generating said fourth signal;

means responsive to a coded function signal from the master station for conditioning the fourth signal generating means for operation; and

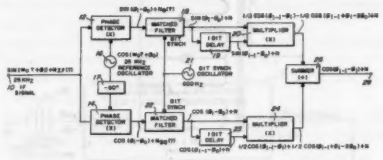
means responsive to a coded command signal from the master station for operating the fourth signal generating means.

3,993,956

DIGITAL DETECTION SYSTEM FOR DIFFERENTIAL PHASE SHIFT KEYED SIGNALS

Merle Lee Gilmore, Fort Lauderdale; Francis Robert Steel, Parkland, both of Fla., and John Anthony Tempka, Glenview, Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Nov. 3, 1975, Ser. No. 628,018
Int. Cl.² H03D 3/06; H03K 9/04; H04B 1/10
U.S. Cl. 325—320 16 Claims



1. A differential phase shift detection system including in combination,

first and second multipliers, each having a first input adapted to receive a digital phase shift signal, a second reference input, and an output,

local oscillator means providing a first output and a second output differing in phase by 90° from said first output, said first and second outputs being coupled respectively to said second inputs of said first and second multipliers,

first and second filters having inputs connected respectively to said outputs of said first and second multipliers, and each having an output,

first and second delay means having inputs and outputs and each providing a delay of one digital bit, said inputs of said first and second delay means being connected respectively to said outputs of said first and second filters,

third and fourth multipliers each having first and second inputs and an output, said inputs of said third multiplier being connected to said output of said first filter and to said output of one of said delay means, and said inputs of said fourth multiplier being connected to said output of said second filter and to said output of the other one of said delay means, and

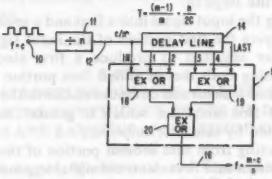
summing means coupled to said outputs of said third and fourth multipliers for combining the output signals thereof.

3,993,957

CLOCK CONVERTER CIRCUIT

David William Davenport, Raleigh, N.C., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Mar. 8, 1976, Ser. No. 664,794
Int. Cl.² H03K 5/00
U.S. Cl. 328—38 4 Claims



1. A frequency multiplying device for generating an output signal which is an integral harmonic of a square wave input signal, said device comprising:

a signal delay line having input and output terminals and at least one tap, the time delay from any terminal or tap to an adjacent terminal or tap being equal to 1/2mC where *m* is a frequency multiplying factor and C is the frequency of said input signal, said delay line having a total time delay of at least $m-1/2mC$; and

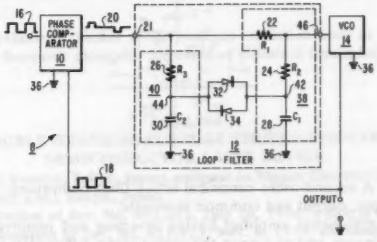
a parity tree connected to m consecutive ones of said terminals and taps, said parity tree operating to supply a significant output signal when any one of a group of selected combinations of input signals is present at said terminals and taps.

3,993,958

FAST ACQUISITION CIRCUIT FOR A PHASE LOCKED LOOP

George Athan Cutsogeorge, Franklin Township, Somerset County, N.J., assignor to RCA Corporation, New York, N.Y.

Filed Aug. 20, 1975, Ser. No. 606,292
Int. Cl.² A03K 5/20
U.S. Cl. 328—109 2 Claims



1. In a phase locked loop (PLL) of the type having an acquisition mode and a locked mode of operation and including a phase comparator, a loop filter and a voltage controlled oscillator (VCO); said phase comparator being responsive to a reference signal and an output signal of sand VCO, and generating an output signal indicative of phase and frequency differences between said reference signal and VCO output signal; said loop filter being responsive to said phase comparator output signals and providing a control signal for said VCO; said phase comparator generating spurious voltage spikes during said locked mode of PLL operation; said loop filter comprising:

first filter means responsive to said phase comparator output signal for providing said PLL with a first predetermined bandwidth during said locked mode of PLL operation;

second filter means, responsive to said phase comparator output signal, for filtering said voltage spikes to ground during said locked mode of operation; and

interconnecting means, coupled between said first and second filter means, for electrically interconnecting said first and second filter means only during said acquisition mode of PLL operation, to provide thereby said PLL with a second predetermined bandwidth during acquisition mode of PLL operation; the improvement wherein:

said first filter means comprises first and second resistors and said first capacitor, each having two terminals, said first resistor being connected at one terminal to said input terminal and the other terminal to one terminal of said second resistor, the other terminal of said second resistor being connected to one terminal of said first capacitor, the other terminal of said first capacitor being connected to a ground; said connection between said first and second resistors being further connected to said VCO to provide said control signal, and

said second filter means comprises a third resistor and said second capacitor, each having two terminals, said resistor being connected at one terminal to said input terminal and at the other terminal to one terminal of said second capacitor, the other terminal of said second capacitor being connected to said ground; and wherein further

said interconnection means comprises a pair of oppositely-poled diodes, connected in parallel between said connection between said second resistor and said first capacitor, and said connection between said third resistor and said second capacitor.

3,993,959

SECOND-ORDER CANONICAL ACTIVE FILTER

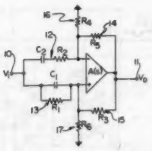
Stalin A. Boctor, Agincourt, Canada, assignor to Northern Electric Company Limited, Montreal, Canada

Filed Dec. 13, 1974, Ser. No. 532,326

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

Int. Cl.² H03B 1/00

U.S. Cl. 328—167 **6 Claims**



1. A second-order canonical active filter comprising:

input, output and common terminals;

a differential amplifier having inverting and noninverting inputs, and an output, the output of the differential amplifier being connected to said output terminal;

a first set of impedances including first and second impedance arms connected between said inverting and noninverting inputs respectively and said input terminal;

a second set of impedances including third and fourth impedance arms connected between said inverting and noninverting inputs respectively and said common terminal;

a third set of impedances including fifth and sixth impedance arms connected between said inverting and noninverting inputs respectively and said output terminal;

each of the impedance arms of one of said sets being complex resistive-capacitive impedances and the other impedance arms of the other two sets being resistive,

said impedances coacting with said differential amplifier to provide a notch filter.

3,993,960

MAGNETIC SIGNAL MIXING AMPLIFIER

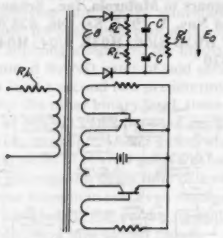
Koosuke Harada, Fukuoka, Japan, assignor to Seibu Denki Kogyo Co., Ltd., Fukuoka, Japan

Continuation of Ser. No. 480,248, June 17, 1974, abandoned, which is a continuation of Ser. No. 297,674, Oct. 16, 1972, abandoned. This application June 2, 1975, Ser. No. 582,802

Int. Cl.² H03F 9/00

U.S. Cl. 330—63 **2 Claims**

1. A linear magnetic signal mixing amplifier for amplifying multiple signals at different levels of potential comprising, a saturable core having a rectangular magnetization characteristic; an input coil on said core for receiving multiple DC input current signals at different levels of potential; output circuit means including an output coil on said core for producing an output voltage proportional to the magnitude of the magnetomotive force produced by said input current signals, said output circuit means and output coil being wholly electrically isolated from said input coil; feed back oscillator circuit means including a coil on said core and transistor circuit means for producing an oscillatory voltage in said coil, said coil being in opposition to the output circuit coil so that there is a difference between the mean values of the positive and negative half waves of the oscillatory voltage produced by the oscillating circuit, said oscillator circuit means and coil being wholly electrically isolated from both said input coil and output circuit means; and said difference between said positive and negative half waves being detected as the output of said output circuit means.



3,993,961

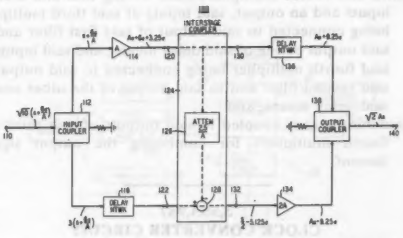
OVERCOMPENSATED FEEDFORWARD METHOD AND APPARATUS USING OVERDISTORTED MAIN AMPLIFIERS

Sundaram Narayanan, Salem, N.H., assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Oct. 31, 1975, Ser. No. 627,388

Int. Cl.² HO3F 1/28

U.S. Cl. 330—149 **7 Claims**



1. A method for providing a substantially distortion-free amplification of an input signal comprising at least a distortion-free component in a feedforward amplifier configuration, comprising the steps of:

a. dividing the input signal into a first and a second portion;

b. amplifying the first portion of the input signal in a first amplifier adjusted to produce a first electrical signal comprising both the amplified first portion of the input signal and a distortion component due to the nonlinearity of said first amplifier which is greater than normally generated by said first amplifier;

c. subtracting from said second portion of the input signal a portion of said first electrical signal to produce a second electrical signal;

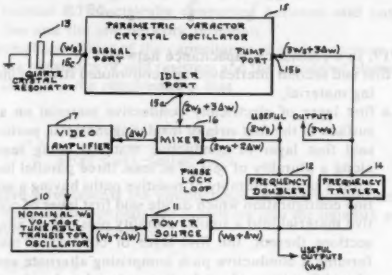
d. amplifying said second electrical signal in a second amplifier to provide a third electrical signal comprising a distortion component which is substantially equal and opposite in phase to the overall distortion component of said first electrical signal; and

e. combining said first and said third electrical signals to provide an output signal comprising an amplification of only the distortion-free component of the input signal.

3,993,962
LOW NOISE PARAMETRIC VARACTOR DIODE CRYSTAL OSCILLATOR

Francis W. Hopwood, Severna Park; Lester K. Staley, Baltimore, and Thomas R. Turlington, Linthicum, all of Md., assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Aug. 18, 1975, Ser. No. 606,041
Int. Cl.² H03B 3/04, 5/36, 5/38, 25/00
U.S. Cl. 331—18 3 Claims



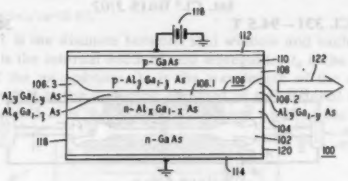
1. A low noise parametric frequency source for radar applications being comprised of a parametric varactor diode crystal oscillator utilizing the negative resistance properties of the varactor diode, said varactor diode crystal oscillator having a signal port, a pump port and an idler port, a quartz crystal resonator connected to ground from said signal port, a phase lock apparatus for said parametric varactor diode crystal oscillator connected between said pump port and said idler port to remove the noisy signal at said idler port, said phase lock apparatus comprised of a voltage controlled transistor oscillator, a power amplifier in series therewith, said voltage controlled transistor oscillator, power amplifier, and quartz crystal resonator being at the same frequency, W_o, a low noise frequency doubling means connected to the output of said power amplifier, low noise frequency tripling means interconnecting the output of said power amplifier and said pump port, mixer means receiving simultaneously the output signals from said idler port and said low noise frequency doubling means, and a video amplifier interconnecting the output from said mixer to the input of said voltage tuneable transistor oscillator, useful output signals from the low noise parametric source being available at the outputs of said power amplifier, said low noise frequency doubling means, and said low noise frequency tripling means.

3,993,963
HETEROSTRUCTURE DEVICES, A LIGHT GUIDING LAYER HAVING CONTIGUOUS ZONES OF DIFFERENT THICKNESS AND BANDGAP AND METHOD OF MAKING SAME

Ralph Andre Logan, Morristown, and Franz Karl Reinhart, Summit, both of N.J., assignors to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed June 20, 1974, Ser. No. 481,244
Int. Cl.² H01S 3/19
U.S. Cl. 331—94.5 H 20 Claims

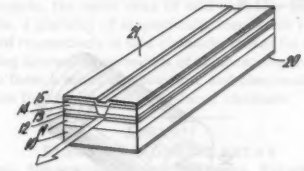
1. A double heterostructure device comprising first and second wide bandgap layers, and a third narrower bandgap layer intermediate to and contiguous with said first and second layers, said third layer being transparent to optical radiation passing therethrough, characterized in that said third layer includes a narrow bandgap first zone and at least one relatively thicker wider bandgap transition zone in tandem therewith along the direction of radiation transmission.



3,993,964
DOUBLE HETEROSTRUCTURE STRIPE GEOMETRY SEMICONDUCTOR LASER DEVICE

Hiroo Yonezu, Tokyo, Japan, assignor to Nippon Electric Company, Ltd., Tokyo, Japan

Division of Ser. No. 492,262, July 26, 1974, which is a continuation of Ser. No. 413,923, Nov. 8, 1973, abandoned, which is a continuation of Ser. No. 267,068, June 28, 1972, abandoned. This application Aug. 18, 1975, Ser. No. 605,550
Int. Cl.³ H01S 3/19
U.S. Cl. 331—94.5 H 1 Claim

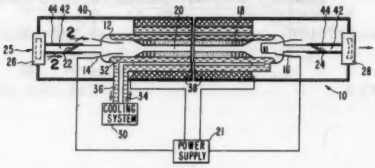


1. A GaAs-$Al_xGa_{1-x}As$ double heterostructure injection laser comprising an N-type GaAs substrate, a first layer made of N-type $Al_xGa_{1-x}As$ epitaxially grown on one major surface of said substrate, a second layer made of GaAs epitaxially grown on said first layer, a third layer made of P-type $Al_xGa_{1-x}As$ epitaxially grown on said second layer, a fourth layer made of N-type GaAs epitaxially grown on said third layer, a silicon dioxide film formed on said fourth layer and having a stripe-shaped opening formed therein, and a thin elongated P-type region formed on the surface of said forth layer through the selective diffusion of P-type impurities through said stripe-shaped opening and into said fourth layer and extending past the junction between said third and fourth layers and into a portion of said third layer, a first electrode covering said silicon dioxide film and said elongaged region, and a second electrode in ohmic contact with the other major surface of said substrate; wherein excitation current supplied through said first electrode is allowed to flow substantially only through the deepest portion of said thin elongated p-type region as the result of a reverse bias developed between said third and fourth layers.

3,993,965
LASER HAVING IMPROVED WINDOWS

Ronald V. Alves, Saratoga, and Verne R. Costich, Mountain View, both of Calif., assignors to Coherent Radiation, Palo Alto, Calif.

Filed Feb. 24, 1975, Ser. No. 552,371
Int. Cl.² H01S 3/02
U.S. Cl. 331—94.5 T 36 Claims

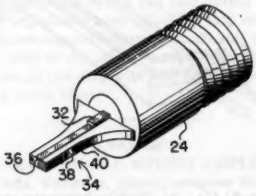


1. A laser comprising:
a. a gaseous lasing medium;
b. a discharge tube for enclosing said gaseous lasing medium;
c. means for exciting said gaseous lasing medium;
d. an optical resonator structure aligned with said discharge tube; and
e. a pair of Brewster angle windows terminating the ends of said discharge tube, said windows comprising crystalline quartz.

3,993,966
IN-LINE WAVEGUIDE TO COAX TRANSITION

John Reindel, San Diego, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed June 16, 1975, Ser. No. 587,445
Int. Cl.² H01P 1/16, 5/10
U.S. Cl. 333—21 R 9 Claims

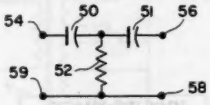


1. A waveguide to coaxial cable transition apparatus comprising:
a section of waveguide having top and bottom portions, said section of waveguide having first and second tapered ridges on the inner walls of said top and bottom portions, respectively;
a section of microstrip medium having a ground plane, a line conductor and a dielectric therebetween, said line conductor being in contact with said waveguide top portion and said ground plane being in contact with said waveguide bottom portion;
a coaxial connector having a connecting tab extending from an inner conductor and also having an outer conductor;
said line conductor being in contact with said connecting tab and said ground plane being in contact with said outer conductor;
the longitudinal axis of said coaxial connector being parallel with the longitudinal axis of said section of waveguide.

3,993,967
RESISTANCE-CAPACITANCE NETWORK

Mansoor Ali Saifi, East Windsor, N.J., assignor to Western Electric Company, Inc., New York, N.Y.

Filed Mar. 31, 1975, Ser. No. 563,905
Int. Cl.² H03H 7/06; H01G 4/40, 4/32
U.S. Cl. 333—70 CR 17 Claims

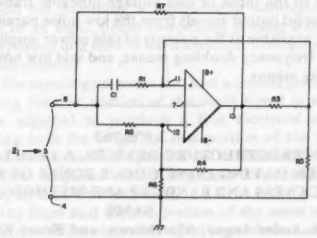


17. In a resistance-capacitance network:
first and second interleaved and convoluted strips of insulating material;
a first layer of electrically conductive material on a first surface of the first strip of insulating material, portions of said first layer of conductive material being removed along a plurality of sets of at least three parallel lines to form a similar plurality of resistive paths having a serpentine configuration which divide said first layer of conductive material into a similar plurality plus one of alternate sections thereof, the first layer of conductive material forming a conductive path comprising alternate sections of said first layer of conductive material and said resistive paths connected in series;
a second layer of electrically conductive material on a first surface of said second strip of insulating material;
first means for electrically contacting only the first section of said first layer of conductive material in said serial conductive path;
second means for electrically contacting only the last section of said first layer of conductive material in said serial conductive path; and
third means for electrically contacting said second layer of conductive material.

3,993,968
SINGLE AMPLIFIER NETWORK FOR SIMULATING AN INDUCTOR

Man Shek Lee, Belmont, Calif., assignor to GTE Automatic Electric Laboratories Incorporated, Northlake, Ill.

Filed Dec. 24, 1975, Ser. No. 644,283
Int. Cl.² H03H 7/44
U.S. Cl. 333—80 R 13 Claims



1. An active, one-port simulation network for simulating an inductor and a resistor, electrically connected in series across the pair of terminals of the network port, comprising:
a differential-input operational amplifier having first and second input lines electrically connected to associated input terminals of the amplifier which are of opposite polarity and having an output line;

a resistor R1 and capacitor C1 electrically connected in series between one network terminal and said first input line;
a resistor R2 electrically connected between the one terminal and said second input line;
a resistor R3 electrically connected between said output line and said first input line;
a resistor R4 electrically connected between said output line and said second input line;
a resistor R5 electrically connected between said first line and the other network terminal, which is connected to a ground reference potential;
a resistor R6 electrically connected between said second input line and ground;
a resistor R7 electrically connected between said output line and the one network terminal;
normalized values of the capacitance of said capacitors and the resistance of said resistors and the simulated elements satisfying the requirements that

$$g7 = \frac{(g1 + g2)(g3g6 - g4g5)}{g5(g2 + g4) - g6(g1 + g3)},$$

where g represents the conductance of a particular one of said resistors, the impedance Z_i looking into the network port satisfying the relationships

$$Z_i = sL + R$$

where

$$L = n1/d0,\ R = n0/d0 \text{ and}$$

$$d0 = g1(g2(g4\ q5 - g3\ g6) + g7(g5(g2 + g4) - g3\ g6))$$

$$n0 = g1(g4\ g5 - g3(g2 + g6))$$

$$n1 = C1(g4(g1 + g5) - g3(g2 + g6)).$$

3,993,969

VACUUM-TIGHT WINDOW ARRANGEMENT FOR RECTANGULAR WAVEGUIDES

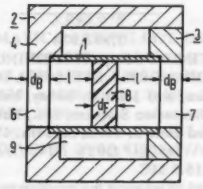
Franz Gross, Munich, Germany, assignor to Siemens Aktiengesellschaft, Berlin, Munich, Germany

Filed Sept. 22, 1975, Ser. No. 615,403

Claims priority, application Germany, Nov. 15, 1974, 382346

Int. Cl.² H01P 1/08, 5/08

U.S. Cl. 333—98 P **10 Claims**



1. A vacuum-tight window arrangement for high power transit time tubes operating in the mm range, comprising:
a rectangular waveguide center element containing a one-piece rectangular dielectric window which is permeable to waves and having a thickness which corresponds to approximately $\lambda_o/2 \cdot \sqrt{\epsilon}$ of the center-frequency passing through the window,
a pair of rectangular apertures on opposite sides of said window,

the elements related by the combined expressions

$$0.4 < l/a < 0.6,$$

$$0.1 < \frac{d_B}{\lambda_o} < 0.15, \text{ and}$$

$$0.65 < a'/a < 0.85,$$

where l is the distance between said window and each aperture, a is the internal width of said waveguide, d_B is the thickness of the an aperture, λ_o is the wavelength of the center frequency, ϵ is the dielectric constant of the material of the window, and a' is the internal waveguide width at the apertures.

3,993,970

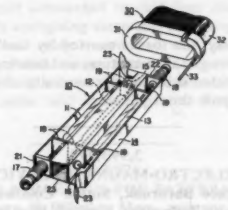
COAXIAL CABLE SWITCH

Richard Miller Brownell, Upper Arlington, Ohio, assignor to Bell Telephone Laboratories, Incorporated, Murray Hill, N.J.

Filed Oct. 23, 1975, Ser. No. 625,244

Int. Cl.² H01H 51/27

U.S. Cl. 335—5 **5 Claims**



1. A coaxial cable switch construction comprising a conductive member formed to present a plurality of open-faced adjacent channels, the inner ones of said channels sharing common walls, a plurality of magnetically responsive relay means positioned respectively in said channels, means for electrically connecting alternating terminals of adjacent ones of said relay means to form a series combination, and electrically conductive means for closing said open-faced channels.

3,993,971

ELECTROMAGNETIC RELAY

Kenji Ono, Neyagawa; Hiromi Nishimura, Takaishi; Tetsuo Mori, Hirakata, all of Japan, and Hans Sauer, Deisenhofen, Germany, assignors to Matsushita Electric Works, Ltd., Osaka, Japan and Hans Sauer, Deisenhofen, Germany, part interest to each

Filed May 14, 1975, Ser. No. 577,181

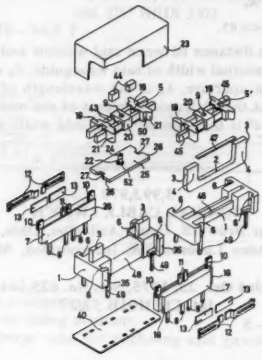
Claims priority, application Japan, May 15, 1974, 49-54368; July 31, 1974, 49-88342; Sept. 13, 1974, 49-106400; Sept. 30, 1974, 49-113025; Oct. 2, 1974, 49-114164; Germany, Nov. 20, 1974, 2454967

Int. Cl.² H01H 50/04

U.S. Cl. 335—202 **52 Claims**

1. An electromagnetic relay comprising within its coil bobbin a magnet core, the ends of which extend substantially at right angles to the longitudinal axis of the bobbin so as to form pole shoes projecting from said coil bobbin and having mutually aligned pole faces and further comprising an armature which is disposed externally of said bobbin between said pole shoes of said magnet core and which is pivotally mounted for rotation about one of its centroid axes, said one axis extending perpendicularly to the longitudinal axis of said bobbin, wherein contact terminals disposed on both sides of the longitudinal axis of said coil bobbin are positively located by being embedded in a contact carrier means, said coil bobbin and the contact carrier means extending substantially over the entire length of the coil bobbin being provided with engaging means

for the mutual positioning and retaining of said contact carrier means and said coil bobbin, said contact terminals having associated therewith prelocated contact springs arranged



within said relay, the forces exerted by said contact springs interacting through said armature, and bearing means for said armature provided substantially centrally of said coil bobbin between said pole shoes.

3,993,972

ELECTRO-MAGNETIC DEVICES

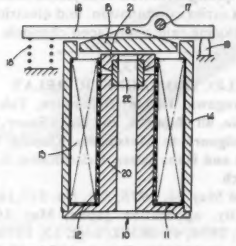
Arthur Laurence Barbrook, Sutton Coldfield, England, assignor to Lucas Industries, Limited, Birmingham, England

Filed July 2, 1975, Ser. No. 592,371

Claims priority, application United Kingdom, Aug. 14, 1974, 35696/74

Int. Cl.² H01F 7/08

U.S. Cl. 335—220 **6 Claims**



1. An electro-magnetic device, including a central pole piece, a winding surrounding said pole piece, an armature attractable into contact with the pole piece and a spring urging the armature away from the pole piece, the pole piece having first and second axially aligned parts of nickel iron alloy and a soft iron part joining said first and second parts and having a cross sectional area less than that of either said first or said second parts, said soft iron part defining, in combination with adjacent ends of said first and second parts, a waisted portion intermediate the ends of said pole piece, said waisted portion providing a restriction in the magnetic circuit of the device, the shape of said waisted portion being such that the distance through which the armature moves against the action of the spring is substantially proportional to the current flowing in the winding.

3,993,973

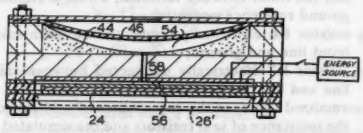
UNDERWATER TRANSIENT SOUND GENERATOR HAVING PRESSURE COMPENSATING FILLET

Roger Hutchins; Tony William Orton, both of Toronto, and Nguyen Thai, Don Mills, all of Canada, assignors to Huntec (70) Limited, Scarborough, Canada

Filed Mar. 17, 1975, Ser. No. 559,299

Int. Cl.² H04R 13/02

U.S. Cl. 340—8 PC **6 Claims**



1. An underwater transient sound generator comprising:
1. an electromagnetic coil,
2. a support member defining a rear support for said coil,
3. a piston,
4. means locating said piston in front of said coil for movement between a normal position adjacent said coil and a forward position spaced in front of said coil,
5. means defining with said piston a small watertight non-compressible gas space at the rear of said piston and said support member when said piston is in said normal position,
6. means for energizing said coil to displace said piston to said forward position,
7. bias means for returning said piston to said normal position upon removal of such energization from said coil,
8. a rigid fillet non-movably located behind said support member, said fillet having a peripheral rim and a smooth shallow concave rearwardly opening surface sloping smoothly inwardly from said rim, said surface being substantially free of abrupt discontinuites,
9. a rear diaphragm lying over said rim and extending across said rear surface of said fillet and defining between said diaphragm and said rear surface a watertight compressible gas space, said compressible gas space being substantially larger than said non-compressible gas space,
10. said support member including an aperture therein communicating between said compressible and non-compressible spaces, said aperture forming part of said non-compressible space, so that when said generator is lowered within a body of water and gas from said compressible space is compressed into said non-compressible space, said rear diaphragm is urged toward said fillet and may adopt the contour of said concave surface.

3,993,974

SEISMIC METHOD FOR DETERMINING THE POSITION OF THE BIT ON A DRILL STEM IN A DEEP BOREHOLE

Daniel Silverman, and John R. Bailey, both of Tulsa, Okla., assignors to Senturion Sciences, Inc., Tulsa, Okla.

Filed June 3, 1974, Ser. No. 475,590

Int. Cl.² G01V 1/14, 1/38

U.S. Cl. 340—15.5 MC **22 Claims**

1. The method of locating the position in the earth of the bit on the bottom of a drill string in a deep borehole, comprising the steps of:

a. positioning a plurality of geophones in the earth in a multi-dimensional array in known positions, with respect to the surface end of the borehole and amplifying and recording the electrical signals generated by said geophones while transducing seismic waves in the earth;

b. pumping water down the drill pipe, through the bit, into the borehole and up the annulus;

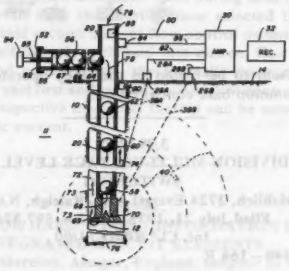
c. near the surface of the earth inserting into the drill pipe an object such that will travel down the drill pipe with

said water until it reaches the bit, where it will substantially block the passage of said water through the openings through the bit, whereby the pressure in the water above said object will rise;

d. permitting said pressure in said water in said pipe to rise until said object is forced through said openings, generating a shock wave as the highly compressed water expands through said bit into the borehole, generating an expanding seismic wave in the earth;

e. detecting the arrival of said seismic wave at each of said plurality of geophones and determining the times of arrival;

f. from the known times of arrival of the seismic wave at said geophones and the known length of pipe, determining the position in the earth of said bit.



17. Apparatus for generating at a series of time-spaced instants, a series of seismic waves at a selected depth in a body of water, comprising;

a. a rigid walled pipe long enough to reach from the surface of said body of water to said selected depth;

b. means to provide a continuing rapid flow of water under pressure through said pipe from the surface end to the bottom end of said selected depth;

c. means at said bottom end of said pipe at said time spaced instants to suddenly close said bottom end and to stop said flow of water; whereby the pressure of said water at said bottom end will suddenly rise; and

d. means solely responsive to said sudden rise in pressure to promptly and suddenly open said bottom end;

whereby said water will explosively expand through said opening into the surrounding water, generating a seismic wave.

3,993,975

AUTOMATIC PARKING LOT GATE

Alvin W. Long, Jr., 10434 Rosedale Lane, Beltsville, Md. 20705; Marvin R. Blumberg, 7105 Broxburn Drive, Bethesda, Md. 20034, and Sami E. Totah, 7504 Newburg Drive, Lanham, Md. 20801

Filed May 30, 1975, Ser. No. 582,390

Int. Cl.² E05F *15/20*; G08G *1/14*

U.S. Cl. 340—51 **17 Claims**

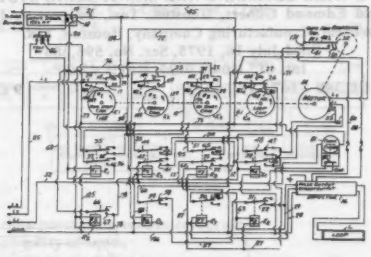
1. For use in connection with a parking lot, a gate bar at the entrance to the lot, normally in an obstructing position, a clearance device ahead of said entrance adapted to receive an authorization means, means to move said gate bar to a non-obstructing position responsive to the reception of such authorization means by said clearance device, vehicle-sensing means in the roadway adjacent said gate bar, means to hold said gate bar in its non-obstructing position while a vehicle is over said sensing means, means to return said gate bar to said obstructing position responsive to the movement of the vehicle away from said sensing means wherein the moving and return means for the gate bar comprises:

1. electrically operated drive means provided with a first drive means energizing circuit including the contacts of normally deenergized first relay means,

2. normally open first cam switch means coupled to the gate bar and closing in response to the initial operation of the drive means,

3. second relay means controlled by said clearance device,

4. normally closed second cam switch means coupled to the gate bar,



5. a first circuit connected to said first relay means for momentarily energizing same and including the contacts of said second relay means and said normally closed second cam switch means, and

6. a second circuit connected to said first relay means for energizing same and including said first cam switch means.

3,993,976

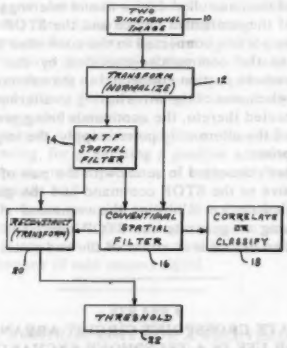
METHOD AND APPARATUS FOR PATTERN ANALYSIS

Arthur P. Ginsburg, N. Billerica, Mass., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed May 13, 1974, Ser. No. 469,194

Int. Cl.² G06K *9/00*

U.S. Cl. 340—146.3 P **3 Claims**



1. Apparatus for analyzing a two dimensional pattern comprising,

means for transforming the pattern into a spatial frequency domain to relate harmonically the elements forming the pattern information,

means for filtering the transformed pattern substantially in accordance with the anisotropic attenuation characteristics of the human visual system, and

means for bandpass filtering the filtered transform to extract spatial frequency subsets from the said filtered transform for feature analysis.

3. A static, single stage, two dimensional, anisotropic, spatial frequency magnitude filter having spatial frequency attenuation characteristics corresponding substantially to the average contrast sensitivity of the human physiological visual system resolution at particular ambient light conditions over 360° of viewing angle.

3,993,977

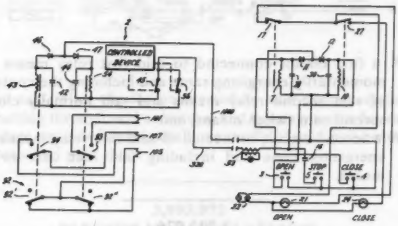
TWO WIRE COMMAND AND MONITORING SYSTEM

Donald Edmond Gilbert, Houston, Tex., assignor to Powell Electrical Manufacturing Company, Houston, Tex.

Filed July 16, 1975, Ser. No. 596,386

Int. Cl.² H04Q *9/06*; H01H *47/00*

U.S. Cl. 340—147 LP **9 Claims**



1. In a transmitting and monitoring system for transmitting at least three commands including aa STOP command for use with a controlled device having two end states, the system including command means for generating commands for movement of the controlled device to and interrogation of the end states of the controlled device and the STOP command and a remote portion connected to the controlled device and responsive to the commands generated by the command means, the remote portion connected to the command means by a pair of wires, one of the wires having an alternating power supply connected thereto, the commands being generated on half-cycles of the alternating power supply, the improvement which comprises:

an inhibitor connected in series with the pair of wires and responsive to the STOP command and the states of the controlled device inhibiting the command means from continuing to generate the STOP command when the controlled device is at either of the end states.

3,993,978

SOLID STATE CROSSPOINT CIRCUIT ARRANGEMENT FOR USE IN A TELEPHONE EXCHANGE

John Edward Hollis, High Wycombe, England, assignor to Plessey Handel und Investments AG., Ilford, England

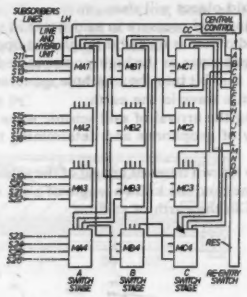
Filed Sept. 26, 1974, Ser. No. 509,473

Claims priority, application United Kingdom, Oct. 2, 1973, 45881/73

Int. Cl.² H04Q *3/50*

U.S. Cl. 340—166 R **12 Claims**

1. A solid state crosspoint comprising first and second transistor means each arranged to operate in its linear region, each of said transistors having an emitter electrode, a collector electrode and a base electrode, the emitter electrodes affording inputs to said crosspoint and the collector electrodes affording outputs of said crosspoint and bias means connected to the base electrodes of the first and second transistors for causing them to be biased so that they operate in current driven, common base configuration.



3,993,979

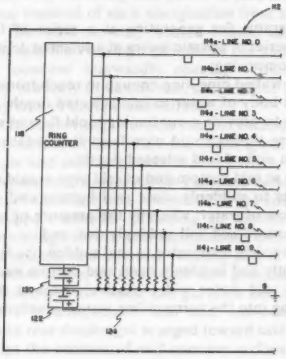
TIME DIVISION-MULTI-VOLTAGE LEVEL MATRIX SWITCHING

Karl R. Mehlich, 2724 Everett Ave., Raleigh, N.C. 27607

Filed July 21, 1975, Ser. No. 597,324

Int. Cl.² H04Q *11/00*

U.S. Cl. 340—166 R **5 Claims**



1. A time division reverse polarity circuit switching system for remotely controlling a plurality of load units from at least one main switching area, said time division reverse polarity circuit switching system comprising:

a. a plurality of main conductor lines operatively connected to a main switching system and leading therefrom to at least one remote area;

b. a plurality of load units operatively connected in said circuit switching system remotedly from said main switching system;

c. each load unit operatively connected in at least one normally open circuit within said circuit switching system, said normally open circuit being achieved by the provision of first and second current flow control means;

d. said first current flow control means including means for closing said normally open circuit in response to electric current of a first polarity while being nonresponsive to current of a second polarity, opposite said first polarity;

e. said second current flow control means including means for closing said normally open circuit in response to the electric current of a second polarity opposite said first

polarity, while being nonresponsive to current of said first polarity;

f. a time division electric pulse generating means operatively connected to said plurality of main conductor lines for applying in a predetermined time sequence electric pulse signals of said first polarity to respective main conductor lines, whereby said electric pulse signals of said first polarity assume separate sequential time slots over a period of time relative to respective main conductor lines and consequently actuate said first current flow control means so as to close that portion of the normally open circuit being controlled thereby;

g. second electric source means of a second polarity, opposite said first polarity, operatively connected to said circuit switching system; and

h. means operatively associated with said circuit switching system for selectively applying said second electric source to respective main conductor lines during selective time slot intervals such that during these selected time slot intervals said second current flow control means is actuated simultaneously with said first current flow control means and consequently, the normally open circuit is closed by said first and second current flow control means and the respective load units therein can be actuated by an electric current.

3,993,980
SYSTEM FOR HARD WIRING INFORMATION INTO INTEGRATED CIRCUIT ELEMENTS

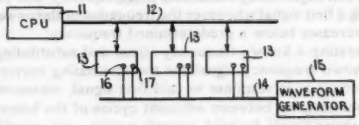
Derek Vidion Moreton, Alsager, England, assignor to International Computers Limited, Stevenage, England

Filed Dec. 12, 1974, Ser. No. 532,056

Claims priority, application United Kingdom, Dec. 14, 1973, 59310/73

Int. Cl.² G06F 9/20

U.S. Cl. 340—172.5 **5 Claims**



1. A system for hard-wiring information into large scale integrated circuit elements each of said elements including at least two terminals for receiving the hard-wired information, the system comprising; (a) waveform generating means for producing a plurality of different waveforms each of which represents a plurality of binary information digits. (b) a group of waveform distribution lines connected to receive respective ones of said waveforms from the generating means; (c) hard-wired connections between the terminals of each of said elements and different combinations of the waveform distribution lines to effect the application to each terminal of each of said elements of one of said waveforms, whereby each of said elements receives a unique multi-digit representation consisting of the different digit representations which are applied to each of the respective terminals; deriving means in each of said elements for decoding said applied waveforms to obtain said binary information digits for establishing in each of said elements an identified code characteristic of the binary information digits hard-wired into said terminals.

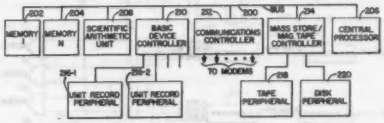
3,993,981
APPARATUS FOR PROCESSING DATA TRANSFER REQUESTS IN A DATA PROCESSING SYSTEM

Frank V. Cassarino, Jr., Weston; George J. Barlow, Tewksbury; George J. Bekampis, Sudbury; John W. Conway, Waltham; Richard A. Lemay, Bolton; David B. O'Keefe, Tyngsboro; Douglas L. Riikonen, Westford, and William E. Woods, Natwick, all of Mass., assignors to Honeywell Information Systems, Inc., Waltham, Mass.

Filed June 30, 1975, Ser. No. 591,964

Int. Cl.² G06F 3/04, 13/00

U.S. Cl. 340—172.5 **16 Claims**



1. A data processing system comprising:

A. a plurality of units;

B. a common electrical bus;

C. means for coupling each of said units to said bus;

D. means for indicating the priority of each one of said units;

E. means, included in each of said units, for requesting the use of said bus for transfer of information to another one of said units during an asynchronously generated transfer cycle;

F. means, included in each of said units, for asynchronously generating a said transfer cycle for the requesting unit, independent of the operation of each of the other ones of said units, if the requesting unit is the highest priority unit requesting a transfer cycle;

G. means, included in the highest priority requesting unit, for enabling the transfer of information during the generated transfer cycle to another one of said units, hereinafter referred to as a receiving unit; and

H. means, included in each of said units, for acknowledging the receipt of information from the highest priority requesting unit, hereinafter referred to as a transferring unit said means for acknowledging comprising

1. first means for generating a first signal if the receiving unit receives an indication that it is the unit to which the transferring unit is transferring the information,

2. second means for generating a second signal if the receiving unit is not busy,

3. third means, coupled to said first and second means for generating, for generating a positive acknowledgment in response to the presence of both said first and second signals, and

4. fourth means, coupled to said first and second means for generating, for generating a negative acknowledgment in response to the presence of said first signal and the absence of said second signal.

3,993,982
SEQUENCE CONTROL UNIT FOR A TELEVISION TIME BASE CORRECTOR

Michael W. Tallent, San Jose; Lee E. Scaggs, Mountain View; Allan L. Swain, Palo Alto; Ronnie M. Harrison, and William B. Hendershot, III, both of San Jose, all of Calif., assignors to Consolidated Video Systems, Inc., Santa Clara, Calif.

Division of Ser. No. 381,463, July 23, 1973, Pat. No. 3,860,952. This application Jan. 10, 1975, Ser. No. 540,024

Int. Cl.² G11C 7/00, 9/00

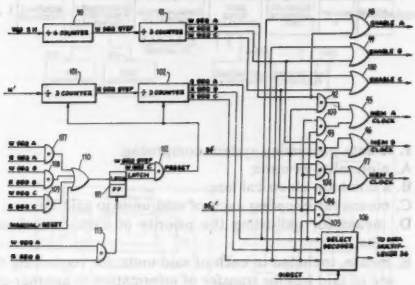
U.S. Cl. 340—173 R **3 Claims**

1. A sequence control unit for sequentially enabling a plurality of memory units for contemporaneous store and fetch operations at rates specified by first and second clock signal trains respectively, said sequence unit comprising:

write enable means adapted to be coupled to a first reference input signal for sequentially generating mutually exclusively write enable signals each specifying a different one of said memory units for a store operation;

means coupled to said write enable means and having an input adapted to be coupled to said first clock signal train for coupling said first clock signal train to different ones of said memory units in accordance with said write enable signals;

read enable means adapted to be coupled to a second reference input signal for sequentially generating mutually exclusive read enable signals each specifying a different one of said memory units for a fetch operation;



means coupled to said read enable means and having an input adapted to be coupled to said second clock signal train for coupling said second clock signal train to different ones of said memory units in accordance with said read enable signals;

means for detecting an overlap condition in which said write and read enable signals specify the same one of said memory units for contemporaneous store and fetch operations; and

means responsive to said detecting means for presetting said read enable means to generate a read enable signal specifying a different one of said memory units whenever said overlap condition is detected.

3,993,983

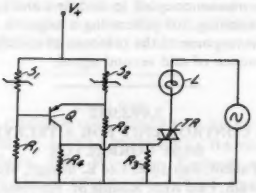
APPARATUS FOR SENSING VARIATIONS IN THE HEAT EXCHANGE PROPERTIES OF A MEDIUM

Robert S. Meijer, Montreal, Canada, assignor to Multi-State Devices Ltd., Dorval, Canada

Filed June 9, 1975, Ser. No. 585,444

Int. Cl.² G08B 21/00

U.S. Cl. 340—239 R **5 Claims**



1. Apparatus for sensing variations in the heat exchange properties of a medium comprising:

a. first and second temperature sensitive switching devices having substantially identical electrical characteristics and exhibiting regenerative switching at a power level which is dependent on the temperature sensed by said switching devices, both said switching devices being exposed to the same ambient temperature in a surrounding medium but only one of them being exposed to variations in the heat exchange properties of the surrounding medium;

b. means for applying D.C. power to both said switching devices at a level such as to maintain them below their switching point under preset conditions of the medium;

c. a coupling device interconnecting said first and second switching device for rapidly inducing regenerative switching action in one of the switching devices in response to unbalance in the heat dissipated by the switching devices due to variations in the heat exchange properties of the surrounding medium from said preset conditions; and

d. a monitoring device, connected to said coupling device, for indicating that one of said switching devices has switched as an indication that the heat exchange properties of the medium have changed.

3,993,984

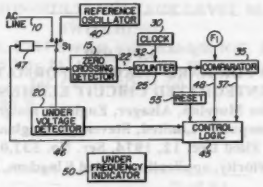
ELECTRONIC UNDERFREQUENCY RELAY

John K. Penrod, Bellbrook, Ohio, assignor to Power Management Corporation, Dayton, Ohio

Filed Apr. 8, 1975, Ser. No. 566,094

Int. Cl.² G08B 21/00

U.S. Cl. 340—248 A **4 Claims**



1. A method of detecting and indicating an underfrequency condition of an alternating current power line including the steps of

sensing the frequency of the alternating current power line by circuit means which measures the time interval between adjacent cycles of said line frequency, and providing a first signal whenever the frequency of the power line decreases below a predetermined frequency;

generating a known frequency signal and substituting said known frequency signal for the alternating current line frequency in response to said first signal, measuring the time interval between adjacent cycles of the known frequency signal by said curcuit means, and providing a second signal if the frequency of said known frequency signal is detected to be within predetermined limits; and

indicating a power line underfrequency condition only in response to both said first and second signals.

3,993,985

INDICATOR FOR THE CONDITION OF A BATTERY OPERATING A TIMEPIECE

Rémy Chopard, Neuchatel; Hubert Portmann, and Eric Saurer, both of Hauterive, all of Switzerland, assignors to Ebauches S.A., Neuchatel, Switzerland

Filed Apr. 29, 1974, Ser. No. 465,347

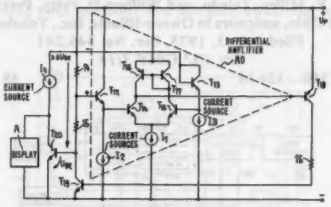
Claims priority, application Switzerland, May 10, 1973, 6627/73

Int. Cl.³ G08B 21/00

U.S. Cl. 340—249 **7 Claims**

1. In an electronic timepiece including a battery power source the voltage of which is not greater than three volts and a sensor circuit having its supply terminals connected to the terminals of the power source, the improvement wherein said sensor circuit comprises: two resistors connected in series; semi-conductor means coupled to said two resistors and said source for establishing a first voltage signal across one of said

resistors; a first transistor acting as a current source having its collector-emitter current path connected in series with said resistors, the series circuit comprising said two resistors and said first transistor being coupled across said battery power source whereby a multiple of said first voltage signal appears across the two resistors and acts as a reference voltage and the



difference between the power source voltage and said reference voltage appears across said current source; a display device; and actuating means supplied by said power source and responsive to the voltage appearing across said current source for energizing said display device when the voltage appearing across said current source falls below a voltage threshold.

3,993,986

DEVICE FOR RESTRICTING THE OPERATION RANGE OF CRANES

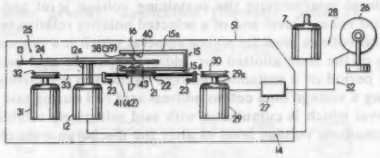
Tadayoshi Honda, Tokyo, Japan, assignor to The Shimizu Construction Co., Ltd., Tokyo, Japan

Filed Feb. 27, 1975, Ser. No. 553,548

Claims priority, application Japan, Mar. 4, 1975, 50-25587; Mar. 6, 1974, 49-26516

Int. Cl.² G08B *21/00*

U.S. Cl. 340—267 C **5 Claims**



1. A device for restricting the operation range of cranes comprising means for detecting the revolving angle of a crane and an operation control board rotated according to the command of said detecting means in synchronism therewith, said operation control board indicating sections of operation range corresponding to the reduced-scale similar figure of the operation site, a discriminator of said section indicating advances and retreats of the revolving angle of the crane according to the command of the detecting means for the operation radius of the crane, relay circuit means for automatically controlling the crane, and alarm relay circuit means, said discriminator making and breaking said relay circuit means for automatically controlling the crane and alarm relay circuit means.

3,993,987

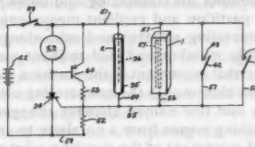
LOCKING DEVICE HAVING AN INTEGRAL ALARM SYSTEM

Edward C. Stevens, 4744 N. Larkin, Milwaukee, Wis. 53211

Filed Mar. 3, 1975, Ser. No. 554,964

Int. Cl.² E05B *45/08*

U.S. Cl. 340—274 R **12 Claims**



1. A locking mechanism having an integral alarm system, including a lock body, shackle means having an end removably connected to the body, an electrically conductive element disposed within said shackle means, locking means disposed within the body and movable between a locked and released position, said locking means when in the locked position engaging the end of said shackle means to prevent removal of said end from the body and said locking means when in the released position permitting free removal of said end of the shackle means from said body, alarm means disposed within the body and connected in a normally non-conductive electrical circuit with said electrically conductive element and a source of electrical power, switch means connected in said circuit and having an open and a closed position, means responsive to moving the locking means to the released position for moving the switch means to the open position and reponsive to moving the locking means to the locked position for moving the switch means to the closed position, and means responsive to severing said element when said switch means is in the closed position for rendering said circuit conductive and actuating said alarm means.

3,993,988

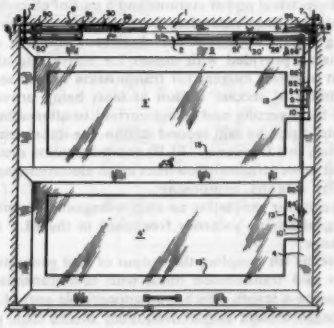
INTRUSION DETECTION APPARATUS TO SIGNAL MOVEMENT OF A PARTITION

John W. Walter, 20 Beechwood Ave., Port Washington, N.Y. 11050

Filed June 2, 1975, Ser. No. 583,154

Int. Cl.² G08B *13/08*

U.S. Cl. 340—274 R **9 Claims**



1. Intrusion detecting apparatus for an alarm system to signal a movement of a door, window, or other movable partition in a wall of an area secured against the unauthorized intrusion, said apparatus comprising:

an elongated member forming an interior channel, said elongated member being mountable on a wall adjacent one side of such partition;

electrical switching means including an element supported on said channel and a cooperating element disposed in said channel for translational motion longitudinally of said channel into and out of cooperative relation with said first-named element to change the state of the switching means between an alarm and a no-alarm condition;

a tensile member for connecting said cooperating element to such partition and resilient means engaged between said cooperating element and said elongated member, said tensile member and said resilient means being arranged so that movement of the partition from a predetermined position moves the cooperating element with respect to said first-named element changing the state of the switching means from a no-alarm to an alarm condition, and movement of the partition substantially back to said predetermined position restores said cooperating element to said cooperative relationship with said first-named element corresponding to the no-alarm condition of said switching means.

3,993,989

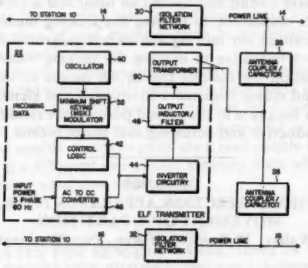
ELF COMMUNICATIONS SYSTEM USING HVDC TRANSMISSION LINE AS ANTENNA

Gedaliahu Held, and K. R. Ananda Murthy, both of Manhattan Beach, Calif., assignors to TRW Inc., Redondo Beach, Calif.

Filed May 19, 1975, Ser. No. 578,795

Int. Cl.² H04M *11/04*

U.S. Cl. 340—310 R **4 Claims**



1. In combination with a high voltage direct current power transmission system including first and second distantly spaced electrical power stations and a pair of electrical power transmission lines extending between said stations for conducting electrical current therebetween, said first station at least being provided with means for converting alternating current to direct current for transmission to said second station, and said second station at least being provided with means for inverting said direct current to alternating current for distribution by said second station, the improvement in an extremely low frequency (ELF) communication system utilizing said power transmission lines as an electromagnetic signal radiating antenna, comprising:

a. means for generating an electromagnetic communication signal having a carrier frequency in the ELF frequency range;

b. means for coupling the output of said generating means to said transmission lines, with said transmission lines having a length which is an appreciable part of the wavelength of said carrier frequency in the ELF range and thereby serving as radiating antenna for propagating said electromagnetic signal into space; and

c. electrical isolation means connected with the said transmission lines between said coupling means and said stations for electrically isolating said communication system from said power stations and for electrically isolating said power stations from said communication system and for permitting simultaneous non-interfering operation of said power and communication systems.

3,993,990

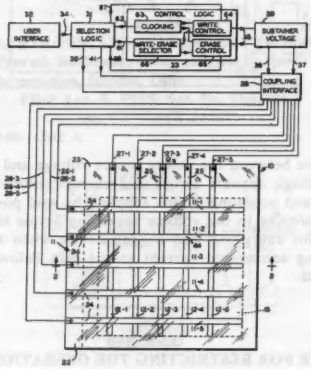
METHOD OF AND APPARATUS FOR ENHANCING DISCHARGE STATE MANIPULATION OF MULTICELLED GAS DISCHARGE DISPLAY/MEMORY DEVICES

John W. V. Miller, Toledo, and William D. Petty, Perrysburg, both of Ohio, assignors to Owens-Illinois, Inc., Toledo, Ohio

Filed Feb. 3, 1975, Ser. No. 546,241

Int. Cl.² G06F *3/14*

U.S. Cl. 340—324 M **35 Claims**



1. In a process for operating a multiple cell gas discharge display/memory panel including the steps of cyclically subjecting said cells to first and second sustaining voltage levels on opposite sides of a neutral voltage level with cycles which are contiguous in time and of a uniform time period and electronically addressing cells within said panel to alter their state of discharge by subjecting said cells to voltage levels intermediate the sustaining voltage levels and said neutral voltage level within a uniform time period of a sustaining voltage cycle, the improvement which comprises: selectively establishing a voltage level intermediate the sustaining voltage level and said neutral voltage level and of a selected polarity relative to said neutral voltage level for a time interval which is a preponderance of the time allotted for addressing within said uniform time period of a sustaining voltage cycle; and selectively imposing a voltage on a cell to address said cell during said time interval which is cumulative with said selectively established intermediate voltage level to alter the discharge state of said cell.

3,993,991

DEVICE FOR DRIVING OR ENERGIZING A DISPLAY DEVICE

Jean Hubertus Josef Lorteije, and Maurice Vincent Whelan, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed May 16, 1975, Ser. No. 578,272

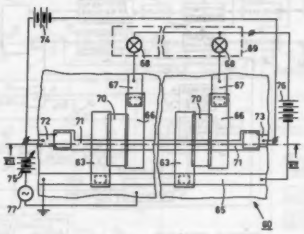
Claims priority, application Netherlands, May 20, 1974, 7406729

Int. Cl.² G11C *11/40*; G01D *7/00*

U.S. Cl. 340—324 R **18 Claims**

1. A semiconductor device for converting an amplitude-varying electrical input signal into electrical outputs whose number or selection depends upon the amplitude of the input signal, comprising a semiconductive body having a surface

region of a first type conductivity, plural spaced first surface zones of a second type conductivity located in said first type region, second surface zone portions of the second type conductivity also located in said first type region and spaced from said first surface zones, an insulating layer over the body surface, a common gate electrode located adjacent the spaces between the first zones and the second zone portions, separate connections coupled to the first zones via which separate signal outputs can be obtained to operate an additional device, a common connection to the second zone portions, means for coupling an input electrical signal between the connection to the second zone portions and the gate electrode, and means



including applying potentials to the electrodes and connections for breaking or making connections between the second zone portions and selected ones of the first zones in accordance with the amplitude of the signal input by terminating or establishing, respectively, in the semiconductive body conductive paths therebetween.

17. A semiconductor device as claimed in claim 1 in combination with a display device having multiple inputs and adapted to produce a display in accordance with the number or selection of inputs energized, and means for coupling each of the first zone connections to one of the display device inputs.

3,993,992

CIRCUIT ARRANGEMENT FOR CONVERTING ANALOG SIGNALS INTO PCM SIGNALS AND PCM SIGNALS INTO ANALOG SIGNALS

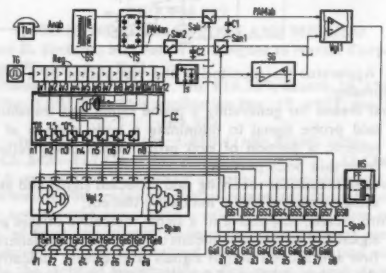
Eduard Zwack, Munich, Germany, assignor to Siemens Aktiengesellschaft, Munich, Germany

Filed June 26, 1974, Ser. No. 483,144

Claims priority, application Germany, June 29, 1973, 2333298

Int. Cl.² H03K *13/02*

U.S. Cl. 340—347 C **7 Claims**



1. A circuit arrangement for converting analog signals for transmission to and from a slave station to PCM signals for transmission and reception over transmission lines, by comparing said analog signals with a reference sawtooth voltage signal represented by a code chain, comprising

a single sawtooth voltage generator for providing said sawtooth voltages

a multistage counter having an output connected to an input of said sawtooth generator and comprising means for providing pulses to said generator, representing the intervals of said received and transmitted PCM signals, the stages of said counter providing at their outputs a code chain representing the instantaneous amplitude of said sawtooth voltage

an incoming store for storing the received PCM signal and an outgoing store for storing the outgoing PCM signal,

a digital compandor having a non-linear characteristic coupled between the individual stages of said counter and the stages of said outgoing store,

a digital comparator for comparing the outputs of said compandor with the received signal in said incoming store,

a first switching device connected between said sawtooth voltage output and said slave station having an operating control input running to the output of said digital comparator, whereupon on detection of equality between said received PCM signal and said companded code chain, the analog signal developed by said sawtooth generator is transferred to said slave station,

an analog comparator having a first input connected over a second switching device to an output of said slave station for receiving analog signals therefrom and a second input connected to the output of said sawtooth, generator, and

input control means having outputs coupled to said outgoing PCM store and having inputs from said digital compandor and said analog comparator for storing said companded code chain as an outgoing PCM signal representing said received analog signal upon detection of equality between said received analog signal and an instantaneous value of said sawtooth voltage.

3,993,993

DIGITAL-TO-SYNCHRO CONVERTER

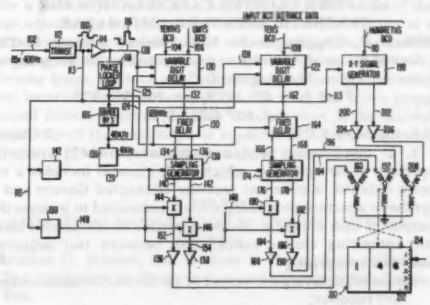
Earl Harris Griffin, Los Angeles, Calif., assignor to RCA Corporation, New York, N.Y.

Continuation of Ser. No. 304,525, Nov. 7, 1972, abandoned. This application Mar. 17, 1975, Ser. No. 559,099

Claims priority, application United Kingdom, June 6, 1972, 26274/72

Int. Cl.² H03K *13/02*

U.S. Cl. 340—347 SY **4 Claims**



1. A digital-to-synchro converter including input means for receiving input data in the form of digital signals representing distance, said converter being suitable for driving a synchro receiver of the type having stator windings spatially separated in predetermined phase relation and a rotor rotatable an angular displacement proportional to the linear distance represented by said digital signals, the windings of said synchro

receiver being adapted for excitation by sinusoidal voltages at a first frequency, comprising in combination:

a. a voltage source for providing a sinusoidal reference signal at said first frequency,

b. means responsive to said sinusoidal reference signal for generating a square wave reference signal at said first frequency,

c. means for coupling said sinusoidal reference signal to said rotor for energizing said rotor,

d. phase locked loop means responsive to said square wave signal for generating a first clock signal,

e. divider means responsive to said first clock signal for generating a second clock signal at a frequency that is a selected fraction of said first clock signal,

f. variable delay means responsive to said digital signals, to said square wave reference signal and to said second clock signal, for generating a variable delayed signal delayed, relative to said square wave reference signal, a phase angle proportional to the distance represented by said digital signals,

g. fixed delay means responsive to said variable delayed signal and to said first clock signal for generating a first delay signal having a phase angle summed from said variable delayed signal phase angle and a first fixed delay phase angle, and for providing a second delay signal having a phase angle summed from said variable delayed signal phase angle and a second fixed delay phase angle,

said first and second fixed delay phase angles being related to the phase separation of said stator windings such that in the absence of said variable delayed signal said rotor is oriented in a position corresponding to zero distance,

h. sampling means for sampling said sinusoidal reference signal in response to said first and second delay signals for generating a pair of D.C. signals each having a magnitude respectively representing a trigonometric function of the respective phase angles of said first and second delayed signals, and

i. analogue multiplying means for multiplying said pair of D.C. signals with said sinusoidal reference signal for generating a control signal for said synchro receiver stator windings to effect step-wise rotation of the rotor thereof an angular displacement corresponding to said distance represented by said digital signals, the magnitude of each of said steps being determined by said second clock signal.

3,993,994
ADAPTIVE CLUTTER CANCELLATION FOR SYNTHETIC APERTURE AMTI RADAR

William B. Goggins, Locke Mills, Maine, assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed June 27, 1975, Ser. No. 590,973
Int. Cl.² G01S 9/42
U.S. Cl. 343—5 CM **2 Claims**

1. In combination with a multichannel AMTI synthetic aperture radar system in which each channel includes a receive antenna, a coherent receiver connected thereto and a synthetic aperture processing circuit connected to process the output of said coherent receiver, clutter cancellation means for optimizing clutter cancellation between two adjacent channels comprising

means for delaying the output of the forward channel coherent receiver,

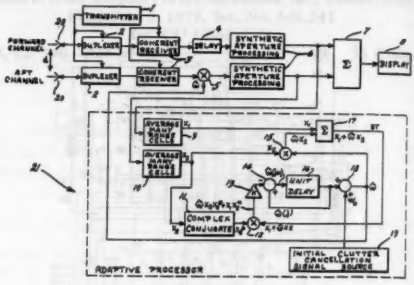
means for averaging the outputs of the adjacent channel synthetic aperture processing circuits over a multiplicity of range cells,

means for generating a clutter cancellation adjustment signal,

a first multiplier means for multiplying the clutter cancellation adjustment signal ω with the output of the aft channel coherent receiver,

a second multiplier means for multiplying the averaged output of the aft channel synthetic aperture processing circuit with the clutter cancellation adjustment signal $\hat{\omega}$, and

means for summing the product of said second multiplier means and the averaged output of the foward channel synthetic aperture processing circuit to obtain a clutter magnitude signal S_T, said clutter cancellation adjustment signal $\hat{\omega}$ being related to said clutter magnitude signal S_T in accordance with the expression

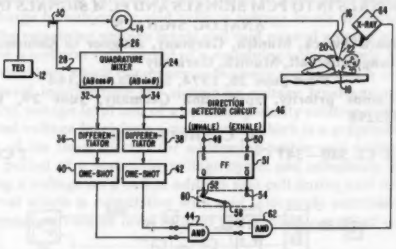


$$\hat{\omega}(j+1) = \hat{\omega}(j) - k\frac{\lambda|S_T|^2}{\lambda\hat{\omega}^*}.$$

3,993,995
RESPIRATION MONITOR

Gerald Stanley Kaplan, Lawrenceville, N.J., and Alvin Seymour Clorfeine, Adelphi, Md., assignors to RCA Corporation, New York, N.Y.

Filed Dec. 8, 1975, Ser. No. 638,847
Int. Cl.² A61B 5/08; G01S 9/04
U.S. Cl. 343—7 ED **5 Claims**



1. Apparatus for monitoring the respiration of a subject comprising:

first means for generating a probe signal and transmitting said probe signal to illuminate a body portion of said subject, a portion of said probe signal being reflected from said body portion;

second means for receiving said reflected signal and generating an output signal indicative thereof;

third means, responsive to a signal indicative of said probe signal and said second means output signal, for generating first and second output signals respectively indicative of the cosine and sine of the phase difference between said probe signal and said reflected signal; and

fourth means, responsive to said third means first and second output signals, for deriving the time derivatives of said third means first and second output signals and gen-

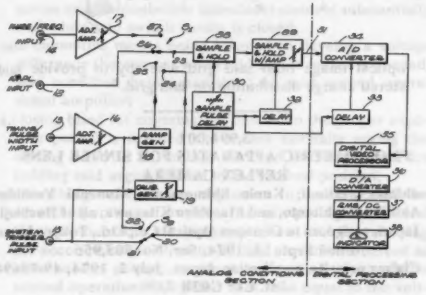
erating an output signal only when said derivatives are concurrently substantially zero, whereby said fourth means output signal is indicative of instants of respiration extrema.

3,993,996

SYSTEM FOR MEASURING PULSE INSTABILITIES IN A RADAR SYSTEM OR THE LIKE

John M. Milan, Los Angeles, Calif., assignor to International Telephone and Telegraph Corporation, New York, N.Y.

Filed Sept. 10, 1975, Ser. No. 611,996
Int. Cl.² G01S 7/40
U.S. Cl. 343—17.7 10 Claims



1. A test device for generating an electrical quantity selectively representative of the fluctuations in at least one of the amplitude, timing, pulsewidth, phase and frequency parameters of the transmittable RF pulse in a pulsed MTI radar system, said device being responsive to the system trigger pulse of said radar and to a signal corresponding to said transmittable pulse, comprising:

first means for converting said selected one of said parameters to a first electrical signal having an amplitude fluctuation corresponding to the fluctuation in the value of said parameter selected;

second means within said first means for sampling said first electrical signal at a predetermined time during each repetition period of said radar system;

third means responsive to the output of said second means for producing a residue signal which continuously represents substantially only the successive amplitude variations of the ouput of said second means from one repetition interval to the next successive repetition interval;

and fourth means responsive to the output of said third means for generating an electrical output signal as a predetermined function of said residue signal.

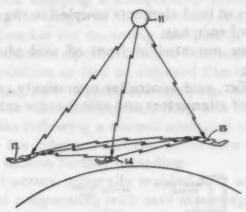
3,993,997

COMMUNICATION SYSTEM AND METHOD

Homer E. Jackson, McLean, Va., assignor to Navsat Corporation, Washington, D.C.

Continuation-in-part of Ser. No. 811,287, March 28, 1969, Pat. No. 3,691,559. This application Dec. 17, 1971, Ser. No. 209,322
Int. Cl.² G08G 5/04; G01S 11/00; G08G 5/00
U.S. Cl. 343—112 CA 37 Claims

1. A method of preventing effective communication between stations otherwise capable of communicating with each other and located more than a selected distance from each other, at least one of said stations including receiver means responsive to energy transmitted from the other station, comprising the steps of transmitting a first pulse to said stations from a position remote from said stations so that the first pulse arrives at said stations at substantially the same time, transmitting a second pulse from the other station upon receipt of said first pulse, receiving the first pulse at said one station, enabling the receiver means in response to receipt of said first pulse at said one station, and decoupling a portion of the receiver



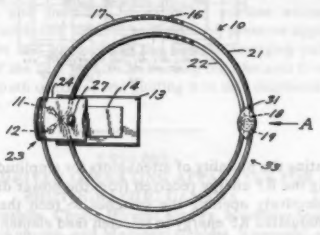
means after receipt of the first pulse at the one station, the time of decoupling being determined by the selected distance and the propagation time of the energy between the stations.

3,993,998

DIRECTIONAL LOOP ANTENNA WITH PLURAL DIELECTRIC COVERINGS

James P. Kimmett, 703 Pierce St., Delphos, Ohio 45833

Filed June 6, 1975, Ser. No. 584,362
Int. Cl.² H01Q 1/44, 7/00
U.S. Cl. 343—744 6 Claims



1. A directional antenna, comprising: a conductive member having a pair of adjacent ends at a first location for connection to a transmission line, said conductive member defining a folded dipole configuration with the legs of the dipole formed into a generally circular loop with the two folded ends of the legs adjacent, overlapping and spaced from one another at a second location, the two folded ends together forming a cross coupling, said folded dipole thus defining a pair of generally circular loops, each of which loops passes through both said first location and said second location with the loops being spaced farther apart at the first location than at the second location such that said loops lie in planes which intersect each other at a point beyond the overlapped folded ends.

3,993,999

AMPLITUDE MODULATION SCANNING ANTENNA SYSTEM

Christian O. Hemmi, and William F. Hayes, both of Dallas, Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed May 16, 1975, Ser. No. 578,231
Int. Cl.² H01Q 3/26
U.S. Cl. 343—854 13 Claims

1. An amplitude modulated scanning system comprising:

a. a source of RF energy;

b. a plurality of power dividers coupled to the source of RF energy for dividing the RF energy for the output terminals of the plurality of power dividers;

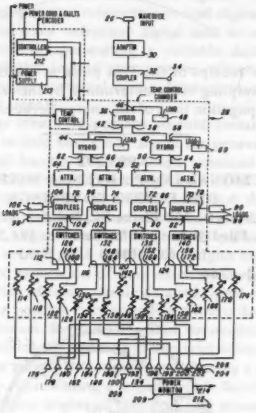
c. a plurality of electronic attenuators coupled to the outputs of the plurality of power dividers for receiving the RF energy;

d. a plurality of switches coupled to the electronic attenuators;

e. a plurality of feed elements coupled to the outputs of the plurality of switches;

f. a reflector mounted in front of said plurality of feed elements;

g. a controller, said controller operatively coupled to said plurality of attenuators and switches for selectively attenuating the plurality of attenuators for amplitude modulating the RF energy received from the power dividers, and selectively opening the switches to feed the amplitude modulated RF energy to selected feed elements for forming a cluster of overlapping beams filling a desired angular scan sector whereby said individual beams of the cluster of overlapping beams continuously rise and fall sequentially to provide a continuous beam sweeping across the reflector; and



h. a support for supporting the feed elements and reflector, said supports supporting the feed elements in a selected spaced relationship to the reflector.

3,994,000

DEVICE FOR ELECTROSTATOGRAPHIC REPRODUCTION OF AN OPTICAL IMAGE USING A CHARGE STORAGE GRID

John W. Trainor, Pittsford, N.Y., and David W. Meltzer, Miami, Fla., assignors to Xerox Corporation, Stamford, Conn.

Filed May 27, 1975, Ser. No. 581,012

Int. Cl.² G03G 5/04, 5/02

U.S. Cl. 346—160 **14 Claims**

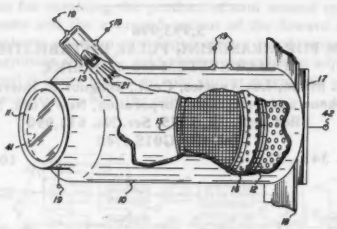
1. A device for forming an electrostatic charge distribution determined by an optical image comprising:

a housing including an array of conducting elements coupling an interior region with an exterior region of said housing;

a source of electrons for propagating electrons toward said array;

a grid for storing a master charge distribution; said grid being disposed between said array and said electron source, said stored master charge distribution controlling the local density of electrons reaching said array and providing said electrostatic charge distribution; and

a cathode responsive to application of said optical image, to emit charged particles in a pattern correlated with said optical image onto said grid whereby to provide said stored charge distribution on said grid.



3,994,001

PHOTOMETRIC APPARATUS FOR SINGLE LENS REFLEX CAMERA

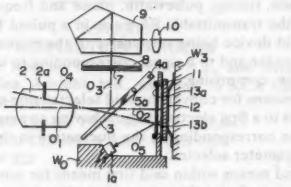
Yoshihisa Maitani; Kunio Shimoyama; Muneaki Yoshida; Akihiko Hashimoto, and Masahiro Kitagawa, all of Hachioji, Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

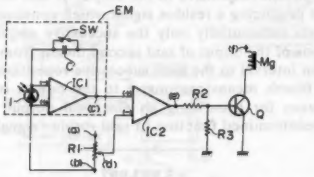
Filed Sept. 13, 1974, Ser. No. 505,956

Claims priority, application Japan, July 2, 1974, 49-75694

Int. Cl.² G03B 7/08

U.S. Cl. 354—51 **9 Claims**





1. A photometric apparatus for a single lens reflex camera and of the type in which an exposure value is determined by photometry of light which is transmitted through a photographic optical system and reflected by at least one of the surfaces of a shutter blind and a film, comprising a photoelectric transducer element for receiving reflected light from at least one of the surfaces of a shutter blind and the film;

a first operational amplifier having inverting and noninverting input terminals, said photoelectric transducer element being connected directly across said terminal;

a feedback path being coupled between the output of said operational amplifier and the inverting input thereof, said feedback path including capacitive means;

a control switch connected across said capacitive means and being normally closed, means responsive to the running of the first blind of the shutter for opening said control switch;

a second operational amplifier having an inverting and a non-inverting input terminal, the non-inverting input terminal being connected to the output of said first operational amplifier;

a power source and a resistive element coupled between said power source and the non-inverting input of said first operational amplifier;

adjustable means being positionable between the ends of said resistance element and the inverting input of the second operational amplifier for adjustably controlling the voltage level applied to the inverting input of the second operational amplifier so as to be at least as great as and preferably greater than the voltage level applied to the non-inverting input of the first operational amplifier;

said feedback circuit being adapted to maintain the voltage across said photoelectric transducer element substantially null when said switch means is closed;

said capacitive means being adapted to develop a voltage difference thereacross when said switch means is opened, said condition being monitored by said second operational amplifier;

a closing blind for covering the film when the proper exposure period is reached and means normally urging the closing blind to cover said film and latching means for holding said urging means in the latched position;

said latching means being responsive to the output of the second operational amplifier for preventing the second shutter blind from initiating movement and for releasing the second shutter blind to initiate movement thereof as soon as the voltage at the non-inverting input of the second operational amplifier is at least equal to the voltage applied to the inverting input of said second operational amplifier.

3,994,002

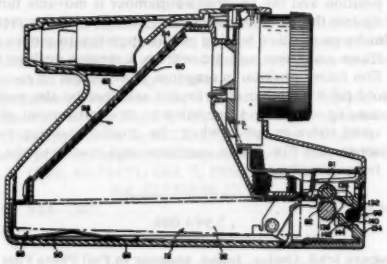
SELF-DEVELOPING CAMERA WITH FILM UNIT DEFLECTING STRUCTURE

Andrew S. Ivester, Charlestown, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Mar. 3, 1975, Ser. No. 554,780

Int. Cl.² G03B *17/00*, *17/52*

U.S. Cl. 354—86 **4 Claims**



1. A self-developing camera for use with a self-developing film unit having a given length, between leading and trailing ends thereof, and an inherent stiffness and including an integral supply of fluid processing composition that is adapted to be distributed within the film unit in response to applying a compressive pressure progressively along the length of the film unit from the leading end towards the trailing end; said camera comprising:

a camera housing including a housing section of molded plastic construction having integrally molded first and second wall portions thereof disposed at substantially right angles to each other;

means for locating such a film unit within said camera housing in position for exposure;

means for exposing the film unit at said exposure position;

a pair of pressure applying members having a film entrance side and a film exit side, opposite said entrance side, and between which the exposed film unit is adapted to be advanced for applying a compressive pressure progressively along the length of the film unit; and

a mounting bracket for mounting said pair of pressure applying members in a predetermined relationship with said exposure position so that an exposed film unit advances between said pair of pressure-applying members from said entrance side, leading end first, and emerges from said exit side following a normal emerging path of travel defined by the inherent stiffness of the film unit;

said housing section further including:

positioning structure integrally molded with said first wall portion and cooperating with said mounting bracket for positioning said housing section in a predetermined operative relationship with said pair of pressure-applying members wherein said second wall portion of said housing section is disposed forwardly of said exit side of said pair of pressure-applying members and is spaced from said exit side a distance less than the given length of the film unit;

structure integrally molded with said second wall portion and defining therein a film exit slot through which a film unit emerging from said exit side of said pair of pressure-applying members is adapted to be advanced from said housing, said exit slot being disposed in said second wall portion at a location that is displaced from the normal emerging path of travel of a film unit; and

a camming member integrally molded with said second wall portion and including a camming surface extending toward said exit side of said pair of pressure-applying members and intersecting the normal emerging path of travel of the film unit for deflecting the film unit from its normal path of travel and guiding it to said displaced film exit slot.

3,994,003

MOTOR-DRIVEN OPERATING APPARATUS FOR A PHOTOGRAPHIC CAMERA

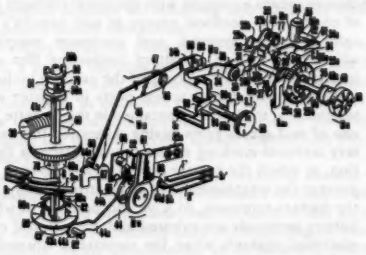
Tomonori Iwashita, Chofu; Hiroshi Aizawa, Machida; Susumu Kozuki, Yokohama, and Masanori Uchidoi, Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed July 8, 1974, Ser. No. 486,368

Claims priority, application Japan, July 10, 1973, 48-81601[U]; Apr. 4, 1974, 49-38164[U]

Int. Cl.² G03B *1/18*

U.S. Cl. 354—173 **5 Claims**



1. A motor-driven operating apparatus for a camera comprising:

rewinding member engageable with a film rewinding spool in a camera body, said rewinding member being movable between a first position at which it engages the spool and a second position at which it does not engage the spool,

a winding member engageable with a film winding spool in the camera body,

driving means coupled to the rewinding member and the winding member and rotatable in a forward direction for winding the film and rotatable in a reverse direction for rewinding the film,

drive control means coupled to the driving means for controlling the driving means, said control means having a changeover switch which switches the driving means from rotation in one directon to the other direction in response to movement of the rewinding member,

a sprocket engageable to film in the camera body, release means for releasing sprocket,

a counter for counting the number of photographed film frames,

resetting means for rotating the counter to its initial position,

operating means for actuating the resetting means, the release means and the rewinding member so that the operation means first actuates the resetting means and release means and moves the rewinding member to the first position to switch the changeover switch and to rotate the driving means in the reverse direction, and

lock means coupled to the operating means for locking the operating means during winding and releasing the operating means during rewinding.

3,994,004

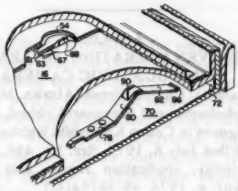
PHOTOGRAPHIC APPARATUS AND PROCESS

Albert J. Bachelder, Lexington, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Division of Ser. No. 286,109, Sept. 5, 1972, Pat. No. 3,798,669. This application June 27, 1973, Ser. No. 374,251

Int. Cl.² G03B *17/50, 19/02, 19/10*

U.S. Cl. 354—202 **9 Claims**



1. A photographic camera having electrically operated systems comprising:

enclosure means equipped with electrical contacts capable of conducting electrical energy to said camera's electrically operated systems, said enclosure means being adapted to receive a battery containing film cassette inserted therein, the housing of the cassette including an exposure opening and access ports in register with the terminals of the battery contained in the cassette, at least one of said access ports having associated therewith battery terminal-masking means movable from a first position, in which the battery terminals are covered so as to prevent the establishment of an electrical circuit through the battery terminals, to a second position in which the battery terminals are exposed and contact said camera's electrical contacts when the cassette is situated within and in operative relationship with said enclosure means;

said camera additionally comprising means, located in said camera at said enclosure means, adapted to engage the battery terminal-masking means upon insertion of the cassette into said enclosure and to move the terminal-masking means from the first position to the second position so as to facilitate the completion of an electrical circuit through said battery terminals and said camera's electrically operated systems.

3,994,005

FILM WINDING AND SHUTTER ACTUATING MECHANISM FOR A CARTRIDGE FILM TYPE CAMERA

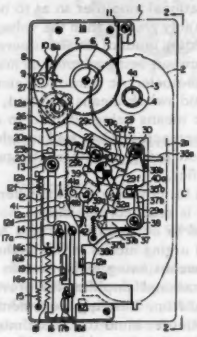
Hirokazu Kaneko, Tokyo, Japan, assignor to Ricoh Co., Ltd., Tokyo, Japan

Filed Sept. 29, 1975, Ser. No. 617,719

Claims priority, application Japan, Sept. 30, 1974, 49-111739

Int. Cl.² G03B *17/42*

U.S. Cl. 354—206 **17 Claims**



1. A camera film winding and shutter actuating mechanism, comprising:

a film take-up spool drive member;

a shutter cocking member movable with the spool drive member;

cocking member stop means operatively arranged to prevent movement of the cocking member beyond a shutter cocking position;

cocking member biasing means releasably connecting the cocking member to the spool drive member so that the cocking member is movable in a film winding direction with the spool drive member up to the shutter cocking position and the spool drive member is movable further against the force of the cocking member biasing means;

film frame position sensing means operative to sense a film frame condition and move from a sensing position to a film frame position in response thereto; and

spool drive member stop means actuated by the position sensing means and operative to stop movement of the spool drive member when the position sensing means senses the film frame condition and moves to the film frame position.

3,994,006

FILM FORWARDING MECHANISM

Hirokazu Ichii, Omiya, Japan, assignor to Fuji Photo Film Co., Ltd., Minami-ashigara, Japan

Filed Aug. 20, 1975, Ser. No. 606,257

Claims priority, application Japan, Aug. 21, 1974, 49-96309

Int. Cl.² G03B *1/02*

U.S. Cl. 354—212 **4 Claims**

1. In a camera housing film and comprising an optical system for direction of image-wise light to expose said film in said camera and shutter means actuable to permit exposure of said film and a film forwarding mechanism, said film forwarding mechanism comprising;

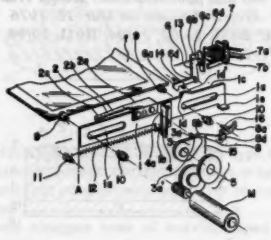
slide plate means reciprocally moveable between a first position and a second position, said first position being reached by said slide plate means upon termination of a film forwarding action and said second position being reached thereby at commencement of a film forwarding action;

engagement means carried by said slide plate means, for engaging an engagement portion of film when said slide plate means is at said second position to forward film during movement of said slide plate means from said second position to said first position;

first retainer means normally positioned to retain said slide plate means at said first position;

release means actuable to disengage said first retainer means from said slide plate means subsequent to termination of action of said shutter means;

spring means exerting constant force urging said slide plate means to said second position;



second retainer means normally positioned to retain said slide plate means in an intermediate position adjacent to said first position subsequent to release thereof from said first retainer means, whereby movement of said slide plate means towards said second position is temporarily prevented; and

rotary drive means, said rotary drive means being actuated subsequent to termination of said shutter means and which when actuated first causes second retainer means to release said slide plate means, whereby said slide plate means moves to said second position, and then causes said slide plate means to move from said second position to said first position, whereby film is forwarded by said engagement means.

3,994,007

AUTOMATIC FLASH PHOTOGRAPHY APPARATUS

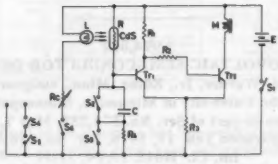
Takashi Uchiyama; Tadashi Ito, both of Yokohama, and Mutsuhide Matsuda, Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 318,471, Dec. 26, 1972, which is a continuation of Ser. No. 68,737, Sept. 1, 1970, abandoned. This application Sept. 11, 1974, Ser. No. 504,894

Claims priority, application Japan, Sept. 9, 1969, 44-71470; Sept. 9, 1969, 44-71471; Oct. 7, 1969, 44-80060

Int. Cl.² G03B *17/38*

U.S. Cl. 354—267 **1 Claim**



1. A control apparatus for operating a flash attached to a camera with a shutter controlled diaphragm, comprising shutter opening means, shutter closing means, circuit means responsive to said shutter opening means and coupled to said shutter closing means for initiating operation of said shutter closing means after a selected time period, trigger means responsive to operation of said closing means for producing a signal to operate the flash, and variable control means in said circuit means for varying the selected time on the basis of at least the distance between the camera and the object to be photographed, said circuit means including operating means responsive to said control means for initiating the operation of said shutter closing means, photosensitive means responsive to the scene being photographed, and switch means having two positions; switchable time constant means including second control means, said switch means, and said photosensitive means, and coupled to said operating circuit for actuating said operating means at selected times in response to the scene being photographed when said switch means is in one position and in response to the variation of said second control means when the switch means is in the other position, said time constant means including a capacitor forming a time constant circuit with said photosensitive means, said variable control means including lamp means whose illumination responds at least to the distance between the camera and the object being photographed and positioned to illuminate said photo-sensitive means, said switch means alternately connecting said lamp means into and out of operation.

3,994,008

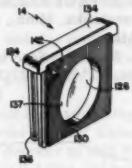
CAMERA ACCESSORY MOUNT

Edwin H. Land, Cambridge, and John B. Morse, Boston, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Continuation of Ser. No. 429,706, Jan. 2, 1974, abandoned, which is a division of Ser. No. 300,820, Oct. 25, 1972, abandoned. This application Apr. 17, 1975, Ser. No. 568,917

Int. Cl.² G03B *11/00*

U.S. Cl. 354—295 **4 Claims**



1. A camera accessory mount adapted to be coupled to an accessory holder of the type including a support member and means defining a pair of laterally spaced open ended channels on the support member for receiving said accessory mount, said accessory mount comprising:

an accessory mounting plate having a forward wall, a rear wall, a pair of opposed side walls intermediate said forward and rear walls, said mounting plate being laterally dimensioned, as measured between said opposed pair of side walls to be slideably inserted between the means defining the pair of laterally spaced channels on the accessory holder;

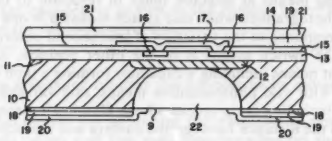
means on said mounting plate for mounting thereon an accessory for modifying the performance of camera; and

a pair of opposed projections, one on each of said pair of side walls of said mounting plate and extending outwardly therefrom, being dimensioned to be slideably inserted into the pair of channels on the accessory holder, through the open ends of the channels, for coupling said mounting plate to the accessory holder, said pair of projections being asymmetrically disposed on said pair of side walls with respect to the forward and rear walls of the mounting plate such that said pair of projections may only be inserted into the pair of open ended channels when said forward and rear walls are in a predetermined orientation with respect to the accessory holder.

3,994,009
STRESS SENSOR DIAPHRAGMS OVER RECESSED SUBSTRATES

Jerome T. Hartlaub, New Brighton, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Division of Ser. No. 331,934, Feb. 12, 1973. This application Sept. 6, 1974, Ser. No. 503,902
Int. Cl.² H01L 29/84, 29/96; G01B 7/16; G01N 3/00
U.S. Cl. 357—26 8 Claims



1. A semiconductor material stress sensitive sensor comprising:

a substrate of semiconductor material having a first major surface and a second major surface opposite one another, said substrate having a recess provided therein opening at said first major surface without said recess intersecting said second major surface,

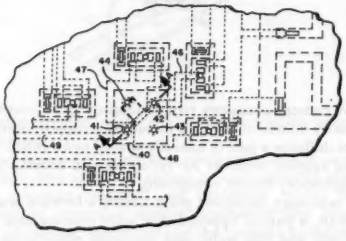
an epitaxial layer of semiconductor material of a first conductivity type on said first major surface entirely covering said recess, and

a region formed in a portion of said epitaxial layer, said region being of a second conductivity type differing from said first conductivtiy type.

3,994,010
HALL EFFECT ELEMENTS

Marvin L. Geske, Minnetonka, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Mar. 27, 1975, Ser. No. 562,622
Int. Cl.² H01L 27/22
U.S. Cl. 357—27 20 Claims



1. A Hall effect magnetic sensor, provided as a thin plate having a major surface, with said magnetic sensor sensitive to magnetic fields directed into said major surface, said magnetic sensor comprising:

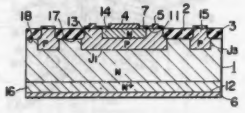
first and second powe contacts each in electrical contact with said major surface effectively over first and second areas thereof, respectively, said first and second areas separated by a first separation length in said major surface with said first separation length directed along a first direction; and

first and second signal contacts each in electrical contact with said major surface effectively over third and fourth areas thereof respectively, said third and fourth areas being separated by a second separation length in said major surface with said second separation length directed along a second direction, with each of said first and second areas having a relatively small extent along substantially said second direction as compared with said second separation length.

3,994,011
HIGH WITHSTAND VOLTAGE-SEMICONDUCTOR DEVICE WITH SHALLOW GROOVES BETWEEN SEMICONDUCTOR REGION AND FIELD LIMITING RINGS

Yutaka Misawa; Tatsuya Kamei, and Takahiro Nagano, all of Hitachi, Japan, assignors to Hitachi, Ltd., Japan

Filed June 17, 1974, Ser. No. 480,292
Claims priority, application Japan, Sept. 3, 1973, 48-98295
Disclosure was also published under second Trial Voluntary Protest Program on Mar. 16, 1976
Int. Cl.² B43K 21/02, 21/04; H01L 29/90, 29/72
U.S. Cl. 357—55 13 Claims



1. A high breakdown voltage semiconductor device comprising:

a semiconductor substrate of a first conductivity type having first and second principal surfaces located on opposite sides of said substrate, said substrate having a first depression extending from said first principal surface to a first prescribed depth into said substrate and surrounding a first surface portion of said first principal surface;

a first semiconductor region of a second conductivity type, opposite said first conductivity type, formed in said first surface portion of said first principal surface, extending into said substrate to a second prescribed depth greater than said first prescribed depth, and defining, with said substrate, a first PN junction which terminates in said depression;

means for increasing the breakdown voltage of said first PN junction comprising a second semiconductor region of said second conductivity type formed in a second surface portion of said first principal surface, extending to a third prescribed depth greater than said first prescribed depth, surrounding said depression, and defining with said substrate a second PN junction, one end of which terminates in said depression and is spaced apart from said first PN junction within a range over which a depletion layer can spread from said first PN junction in said substrate when said first PN junction breaks down; and

insulator material disposed on the surface of said depression.

3,994,012
PHOTOVOLTAIC SEMI-CONDUCTOR DEVICES

Raymond M. Warner, Jr., Edina, Minn., assignor to The Regents of the University of Minnesota, Minneapolis, Minn.

Continuation-in-part of Ser. No. 575,258, May 7, 1975. This application Feb. 17, 1976, Ser. No. 658,307
Int. Cl.² H01L 27/14, 27/12
U.S. Cl. 357—30 59 Claims

17. A semiconductor body, comprising:

a. a supportive substrate having at least an upper layer of electrically insulating material;

b. a thin layer of single-crystalline semiconductor material overlying said substrate and having an upper surface for receiving energetic electromagnetic radiation, comprising:

i. a first conductivity type layer directly overlying said insulating substrate material; and

ii. a second conductivity type layer directly overlying said first conductivity type layer, the intersection of said first and said second conductivity type layers forming a first p-n junction in a plane essentially parallel to said irradiated upper surface and substantially underlying the entire area of said upper surface;

c. a first elongate zone of heavily doped said first conductivity type extending continuously from said irradiated upper surface into said first conductivity type layer, providing a low-impedance current path for majority carriers from said first conductivity type layer to said upper surface; and

d. a second elongate zone of heavily doped said second conductivity type extending continuously from said irradiated upper surface into said channel conductivity type layer, providing a low-impedance current path for majority carriers from said second conductivity type layer to said upper surface.

3,994,013

LAST LINE VELOCITY COMPENSATION

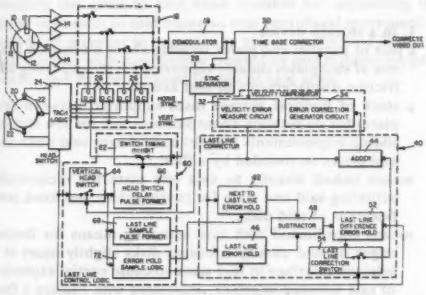
Maurice G. Lemoine, and Leonard A. Pasdera, both of Redwood City, Calif., assignors to Ampex Corporation, Redwood City, Calif.

Filed Mar. 3, 1975, Ser. No. 554,939

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 10, 1976

Int. Cl.² H04N *5/795*

U.S. Cl. 358—8 **17 Claims**



1. A method of determining last line velocity error in a time varying signal including time base information reproduced from a record medium by a plurality of transducers between which reproduction of the signal is switched comprising the steps of determining the last line velocity error occurring during a certain last determined period of said signal before transducer switchings, and adjusting each of the last line velocity errors occurring during other last determined periods of said signal before transducer switchings in accordance with said determined last line velocity error.

3,994,014

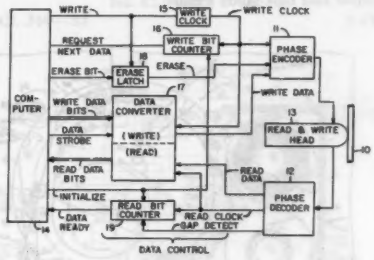
CIRCUIT FOR REWRITING BLOCKS OF PHASE ENCODED DATA

Samuel G. Burgiss, Raleigh, N.C., assignor to Corning Glass Works, Corning, N.Y.

Filed Dec. 10, 1975, Ser. No. 639,222

Int. Cl.² G11B *5/09*

U.S. Cl. 360—42 **3 Claims**



1. In a system for storing digital data on a magnetic medium comprising

read-write means for writing data on said medium and for reading data from said medium,

a phase encoder for receiving binary coded digital data and providing said read-write means with a phase encoded signal, said phase encoder having an erase input terminal for receiving an erase signal which causes said read-write means to erase said magnetic medium,

a phase decoder for receiving a phase encoded signal from said read-write means and providing a binary coded digital signal,

a data source and sink for providing write data bits which are to be written on said magnetic medium and for providing a write-signal which signifies the beginning of a write mode, and

a data control circuit for transferring said write data bits to said phase encoder and for transferring said read data from said phase decoder to said data source and sink,

said data control circuit being characterized in that it comprises

an erase latch having an output terminal connected to the erase terminal of said phase encoder and an input terminal for receiving said write-signal from said data source and sink, said erase latch providing said phase encoder with an erase signal which causes erasure of said magnetic medium for a predetermined period of time following the ongoing transition of said write-signal.

3,994,015

OVERLOAD PROTECTION CIRCUIT FOR TAPE RECORDING AND/OR REPRODUCING APPARATUS

Masao Tomioka, Kawaguchi, and Yasunori Orihara, Tokyo, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Aug. 28, 1974, Ser. No. 501,253

Claims priority, application Japan, Aug. 30, 1973, 48-101819[U]

Disclosure was also published under second Trial Voluntary Protest Program on Feb. 3, 1976

Int. Cl.² G11B *15/24, 15/66, 23/04*

U.S. Cl. 360—85 **12 Claims**

1. Tape recording and/or reproducing apparatus comprising:

a rotary head drum assembly comprising a rotary magnetic head and a tape guide drum;

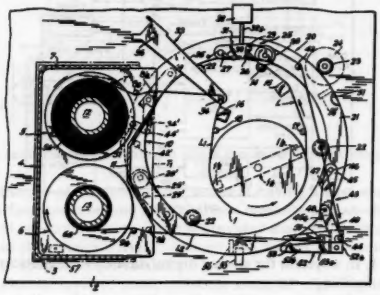
means to support a supply of tape adjacent said assembly;

tape guide means movable in one direction from an initial position to a final position for withdrawing a loop of said

tape from said supply and wrapping said loop on the periphery of said drum, and in the opposite direction from said final position to said initial position for unwrapping said loop and returning it to said supply;

electrically energized drive means selectively operable to move said tape guide means in said one direction and in said opposite direction;

timing means to measure predetermined intervals of time slightly longer than the normal lengths of time required to move said tape guide means



in said one direction from said initial position to said final position and in the opposite direction from said final position to said initial position, respectively; and

means responsive to said timing means to halt the electrical energizing of said drive means during operation of the latter for moving said tape guide means in said one direction and in said opposite direction at the ends of said respective predetermined intervals of time.

3,994,016

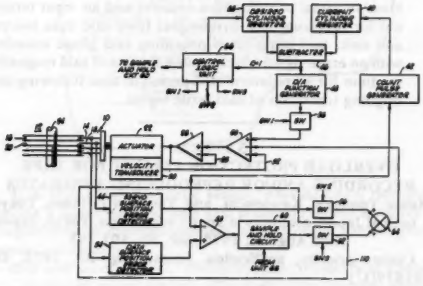
HEAD POSITIONING SERVO SYSTEM FOR DISK DRIVES

Hossein Moghadam, Norman, Okla., assignor to Honeywell Information Systems, Inc., Waltham, Mass.

Filed Mar. 31, 1975, Ser. No. 563,944

Int. Cl.² G11B 5/56, 21/8, 21/10

U.S. Cl. 360—77 **14 Claims**



1. For use in a disk drive employing a ganged head assembly and a multiple surface disk recording medium having at least one servo surface dedicated to channels of servo information and one or more data surfaces having channels containing data and servo information, a head positioning servo system comprising:

a. a servo surface position error circuit including a servo head in the ganged head assembly for generating a first error signal representing the position of the servo head relative to the center of a selected channel on the servo surface;

b. a data surface position error circuit connected to the other heads in the ganged head assembly for generating a second error signal representing the position of a selected head relative to the center of a selected channel on a data surface;

c. a difference circuit connected to the servo surface position error circuit and the data surface position error circuit and the data surface position error circuit for establishing a difference signal representing the difference of the first error signal and the second error signal; and

d. head positioning means responsive to the sum of the first error signal and the difference signal for moving the transducer assembly toward a position wherein the second error signal is minimized.

3,994,017

RANDOM ACCESS DISK FILE WITH AXIAL TRANSLATION OF DISKS AND END PLATE

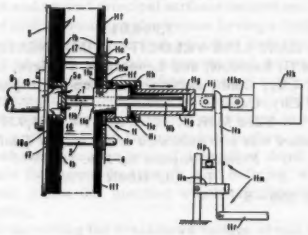
Earl D. Barkhuff, Staatsburg; David S. Borm, Red Hook; Bernard W. McGinnis, Poughkeepsie, and Bertel E. Rosenlund, Hopewell Junction, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed July 1, 1974, Ser. No. 484,482

Disclosure was also published under second Trial Voluntary Protest Program on Mar. 23, 1976

Int. Cl.² G11B 5/012, 23/02, 5/82

U.S. Cl. 360—98 **28 Claims**



1. In a storage device:

a pair of parallel end plates rotating about a common axis; one of said plates slidably supported for reciprocating low friction displacements to said axis;

a stack of multiple storage disks supported between said plates for co-rotation about said axis and for low friction sliding displacements parallel to said axis; said disks and end plates surrounded by a fluid;

means linked directly to said one plate for reciprocally actuating said one plate for causing close and loose confinement of said disks;

means coordinated with said actuating means for forcing edges of said closely confined disks slightly apart at a selected interface in said stack to cause partial expansion of said selected interface, associated with causing a fluid pressure difference between the selected interface and the other interfaces; said partial expansion insufficient for unobstructed transducing access to said disks; and

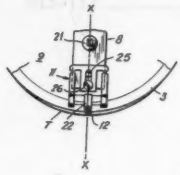
means operable following said partial expansion for operating said actuating means to shift said one plate quickly to said position of loose confinement, whereby, due to cohesion and suction effects accompanying said shaft and due to said established pressure difference, the disks between said partially expanded interface and said one plate are shifted slidably with said one plate as a cohesive unit, thereby further expanding said selected interface sufficient for unobstructed transducing access.

3,994,018

ROTARY HEAD ASSEMBLY HAVING RESILIENT POSITIONING AND RESTRAINING MEANS MOUNTING THE HEAD

Nobutoshi Kihara, and Katsumasa Takahashi, both of Tokyo, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Apr. 8, 1975, Ser. No. 566,539
Claims priority, application Japan, Apr. 26, 1974, 49-47312
Int. Cl.² G11B 5/54, 21/22
U.S. Cl. 360—105 9 Claims



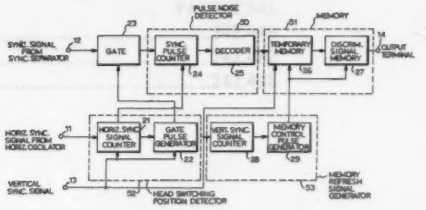
1. A rotary head assembly comprising, a generally U-shaped frame having a pair of spaced apart arms which are joined together at one end and are capable of resilient flexing toward and away from each other, means for mounting said frame for movement in a circular path with the free end portions of said arms extending generally radially outward in respect to the center of such path, a head member for recording and/or reproducing information signals on a record medium and which is dimensioned to fit between said spaced apart arms with substantial clearance therebetween, and resilient support means extending between said arms and being secured intermediate the arms to said head member for supporting the latter in respect to said frame so that centrifugal movement of said head member in response to movement of said frame in said circular path is resiliently resisted by said resilient support means and by the resilient flexing of said arms.

3,994,019

VTR SIGNAL DISCRIMINATING APPARATUS IN A TELEVISION RECEIVER

Takayuki Sagishima, Suita; Teruo Kitani, Takatsuki, and Reiichi Sasaki, Hirakata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Filed Nov. 25, 1974, Ser. No. 527,149
Claims priority, application Japan, Nov. 26, 1973, 48-132372; Nov. 26, 1973, 48-132376
Int. Cl.² G11B 27/36
U.S. Cl. 360—33 5 Claims



1. A VTR signal discriminating apparatus for a television receiver having a horizontal sync separator and a horizontal oscillator, said apparatus comprising:

head switching position detecting means having an input terminal for horizontal sync signals from said horizontal oscillator and another input terminal for vertical sync signal for detecting a specific interval in each vertical scanning interval during which video heads of a VTR may be switched when said television receiver is receiving signals from said VTR;

gate means having an imput terminal for sync signals from said sync separator and coupled to said head switching position detecting means for passing said sync signals from said sync separator during said specific interval in which said video heads of said VTR may be switched; pulse noise detecting means coupled to said gate means for detecting video head switching noises mixed in said sync signals from said sync separator;

memory means coupled to said pulse noise detecting means for memorizing information as to whether said pulse noise detector has detected said video head switching noises or not between memory refresh signals; and

memory refresh signal generating means for generating said memory refresh signals and for supplying the same to said memory means.

DESIGN PATENTS

GRANTED NOVEMBER 23, 1976

ERRATA

For CLASS	See PATENT NO.
025–036	242,446
015–054	242,482
015–112	242,498

DESIGNS

NOVEMBER 23, 1976

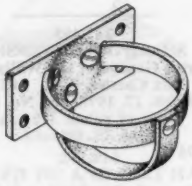
NOTE—A cross reference listing of applications published under the second Trial Voluntary Protest Program is located in the back of this Issue. These entries will be in numerical order by document publication number.

242,399
SPORTS HELMET
Malcolm F. Cox, Mississauga, Ontario, Canada, assignor to Canada Cycle & Motor Company Limited, Weston, Ontario, Canada
Filed July 30, 1975, Ser. No. 600,233
Claims priority, application Canada Mar. 24, 1975
Term of patent 14 years
Int. Cl. D2—*03*
U.S. Cl. D2—231

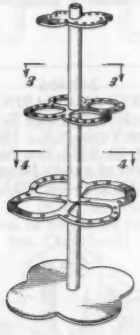
242,400
BOOT
Bradley A. Harrington, 210 Prospect, Bellingham, Wash. 98225
Original design application Aug. 2, 1973, Ser. No. 385,182, now U.S. Patent 238,523. Divided and this application Apr. 21, 1975, Ser. No. 569,766
Term of patent 7 years
Int. Cl. D2—*04*
U.S. Cl. D2—272

242,401
SPORTS SHOE
Benjamin Wunsch, 67 Burning Tree Road, Greenwich, Conn. 06830
Filed Mar. 24, 1975, Ser. No. 556,562
Term of patent 14 years
Int. Cl. D2—*04*
U.S. Cl. D2—310

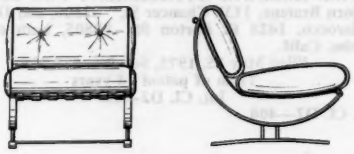
242,402
BALL HOLDING ATTACHMENT FOR BELTS
Osbjorn Bratene, 1137 Chancer St. 32806, and David F. Marocco, 1428 E. Burton St. 92805, both of Anaheim, Calif.
Filed May 15, 1975, Ser. No. 577,935
Term of patent 14 years
Int. Cl. D2—*07*
U.S. Cl. D2—400



242,403
DISPLAY STAND FOR JEWELRY AND THE LIKE
Donna Jean Webster, 1713 Oahu Place, Costa Mesa, Calif. 92626
Filed Nov. 3, 1975, Ser. No. 628,346
Term of patent 14 years
Int. Cl. D6—*04;* D20—*02*
U.S. Cl. D6—24

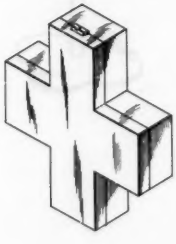


242,404
CHAIR
Jose A. Lopez, Miami, Fla., assignor to Camilo Muebles, Inc., Coral Gables, Fla.
Filed May 28, 1975, Ser. No. 581,699
Term of patent 14 years
Int. Cl. D6—*01*
U.S. Cl. D6—30

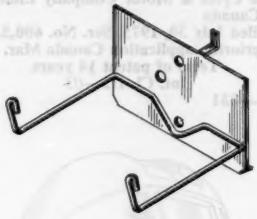


242,405
SHAMPOO DISPENSER
Enrico Genovese, 360 William St., Port Chester, N.Y. 10573
Filed Feb. 27, 1976, Ser. No. 662,430
Term of patent 3½ years
Int. Cl. D9—*01*
U.S. Cl. D6—95

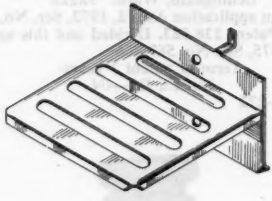
242,406
FIRST-AID CABINET
David L. Romanoff, 29 E. 28th St., New York, N.Y. 10016
Filed Sept. 22, 1975, Ser. No. 615,582
Term of patent 14 years
Int. Cl. D6—*04*; D23—*02*
U.S. Cl. D6—104



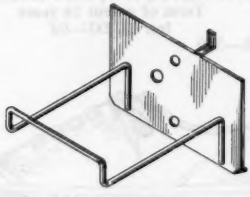
242,407
PEGBOARD MOUNTED SUPPORT FOR SABRE SAWS, JIGSAWS, OR THE LIKE
Albert J. Enckler, North Olmsted, Ohio, assignor to ABL Associates, Inc., Cleveland, Ohio
Filed Sept. 11, 1975, Ser. No. 602,528
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—114



242,408
PEGBOARD MOUNTED SUPPORT FOR SCREWDRIVERS
Albert J. Enckler, North Olmsted, Ohio, assignor to ABL Associates, Inc., Cleveland, Ohio
Filed Sept. 11, 1975, Ser. No. 602,455
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—125



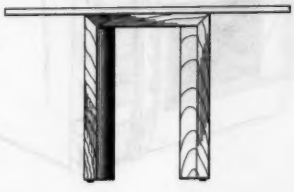
242,409
PEGBOARD MOUNTED SUPPORT
Albert J. Enckler, North Olmsted, Ohio, assignor to ABL Associates, Inc., Cleveland, Ohio
Filed Sept. 11, 1975, Ser. No. 602,456
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—125



242,410
MULTIPLE STATION DESK
Ivan F. Goulooze, 3407 3 Mile Road NW., Grand Rapids, Mich. 49504
Original design application Mar. 18, 1974, Ser. No. 451,963, now Patent No. 238,841. Divided and this application Dec. 4, 1975, Ser. No. 637,732
Term of patent 14 years
Int. Cl. D6—*04*
U.S. Cl. D6—146

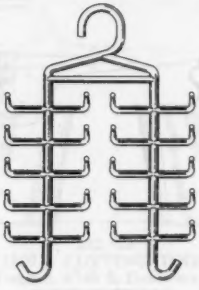
242,411
TABLE OR SIMILAR ARTICLE OF FURNITURE
Fred T. Walker, Taylorsville, N.C., assignor to Walker Foundry Company, Inc.
Filed July 3, 1975, Ser. No. 592,822
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D6—147

242,412
TABLE
Judith W. Fister, 7715 Park Creek Drive, Centerville, Ohio 45459
Filed July 31, 1975, Ser. No. 600,881
Term of patent 14 years
Int. Cl. D6—*03*
U.S. Cl. D6—175



242,413
DECORATOR DISPLAY STAND OR SIMILAR ARTICLE
Dennis E. Olson, 1232 Waimanu St., Honolulu, Hawaii 96814
Filed Apr. 14, 1975, Ser. No. 568,163
Term of patent 7 years
Int. Cl. D6—*06*
U.S. Cl. D6—191

242,414
COMBINED TIE AND BELT HANGER
Mack Salladay, Pittsburgh, Pa., assignor to Action Industries, Inc., Cheswick, Pa.
Filed May 10, 1976, Ser. No. 684,656
Term of patent 14 years
Int. Cl. D6—*08*
U.S. Cl. D6—251

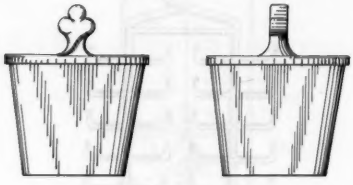


242,415
CUP OR SIMILAR ARTICLE
Frank J. Benes, Lancaster, Ohio, assignor to Anchor Hocking Corporation, Lancaster, Ohio
Original design application Sept. 13, 1973, Ser. No. 397,069, now Patent No. 238,541. Divided and this application Feb. 13, 1975, Ser. No. 549,529
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—9

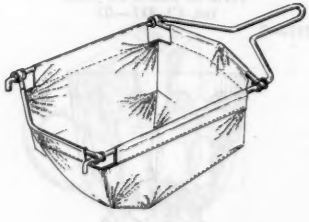
242,416
BEVERAGE GLASS OR SIMILAR ARTICLE
Walter B. Achenbach, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio
Filed Dec. 13, 1973, Ser. No. 424,354
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—15

Disclosure was also published under the second Trial Voluntary Protest Program on Feb. 10, 1976

242,417
SUGAR BOWL
Adeline M. Nicholas, Sacramento, Calif. (Bamarcia Drive, Elk Grove, Calif. 95624)
Filed June 4, 1975, Ser. No. 583,564
Term of patent 14 years
Int. Cl. D7—*01*
U.S. Cl. D7—17

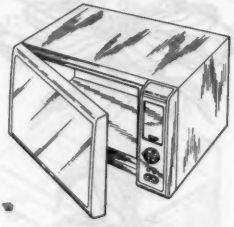


242,418
STRAINER
Bernard Friedman, Allentown, Pa., assignor to Bernard Friedman
Filed Nov. 7, 1974, Ser. No. 521,907
Term of patent 14 years
Int. Cl. D7—*04*
U.S. Cl. D7—47

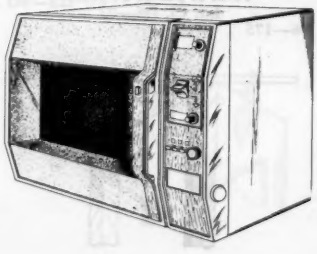


242,419
NAPKIN HOLDER
Virginia Stamatovich, 3704 Parson Blvd., Flushing, N.Y. 11354
Filed Mar. 31, 1975, Ser. No. 563,379
Term of patent 14 years
Int. Cl. D7—*06*
U.S. Cl. D7—72

242,420
ELECTRONIC COOKING RANGE
Yoshihumi Ura and Kouichi Sonoda, Osaka, Japan, assignors to Sharp Kabushiki Kaisha
Filed Apr. 11, 1975, Ser. No. 567,414
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—128

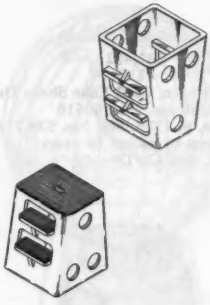


242,421
MICROWAVE OVEN
Martin H. Pitstick, Cleves, Ohio, and Charles H. Schmitt, Louisville, Ky., assignors to General Electric Company
Filed May 12, 1975, Ser. No. 576,800
Term of patent 14 years
Int. Cl. D7—*02*
U.S. Cl. D7—128

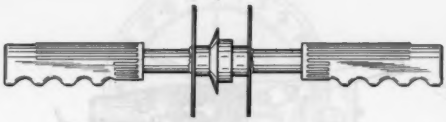


242,422
FRUIT KNIFE
Nihachi Kudo, No. 13—10, Konakano Kita 5-chome, Hachinohe-shi, Aomori-ken, Japan
Filed Jan. 30, 1975, Ser. No. 545,455
Claims priority, application Japan Oct. 12, 1974
Term of patent 14 years
Int. Cl. D7—*03*
U.S. Cl. D7—143

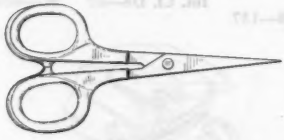
242,423
CONVERTIBLE WASTE BASKET/STEP STOOL
Robert L. Culligan, 624 Bailey Road, West Henrietta, N.Y. 14586
Filed Nov. 28, 1975, Ser. No. 636,142
Term of patent 14 years
Int. Cl. D7—*07*
U.S. Cl. D7—191



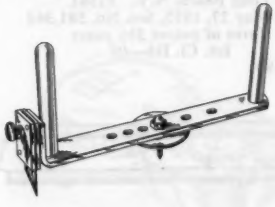
242,424
SHEET METAL CHANNEL OPENER
Kenneth W. Morgret, 6052 Uno St., Arvada, Colo. 80002
Filed Dec. 12, 1975, Ser. No. 640,058
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—51



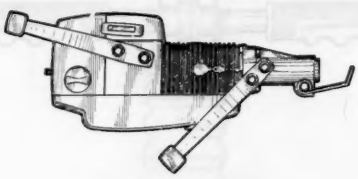
242,425
EMBROIDERY SCISSORS
Olof Fredrik Backstrom, Tammisaari, Finland, assignor to Oy. Fiskars AB, Helsinki, Finland
Filed May 12, 1975, Ser. No. 576,489
Claims priority, application Finland Nov. 15, 1974
Term of patent 14 years
Int. Cl. D8—*03*
U.S. Cl. D8—57



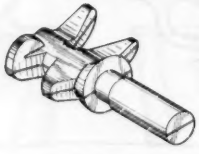
242,426
HOLE CUTTING TOOL
Jack L. Twedell, 6749 S. Delaware, Littleton, Colo. 80120
Filed May 12, 1975, Ser. No. 576,564
Term of patent 14 years
Int. Cl. D8—*03*
U.S. Cl. D8—59



242,427
MOTOR HAMMER
Jan Wilsgaard, Vårbäcksvägen 4, Torslanda, Sweden 42300
Filed June 3, 1974, Ser. No. 476,068
Claims priority, application Sweden Dec. 3, 1974
Term of patent 14 years
Int. Cl. D8—*05*
U.S. Cl. D8—67

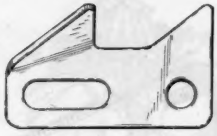


242,428
CAM FOR A FASTENING MECHANISM FOR CONTAINER DOORS
Barry Stanley Morris, Walsall England, assignor to The Blowich Lock and Stamping Company, Limited, Staffordshire, England
Filed Jan. 31, 1975, Ser. No. 546,115
Term of patent 14 years
Int. Cl. D8—*07*
U.S. Cl. D8—137



242,429
NAMEPLATE
David Damast, 522 Shore Road, Long Beach, N.Y. 11561
Filed May 27, 1975, Ser. No. 581,364
Term of patent 3½ years
Int. Cl. D8—*09*
U.S. Cl. D8—180

242,430
MOUNTING PLATE FOR DIGGER FINGERS
Howard W. Worthington, Saint Charles, Ill., assignor to Howard Worthington, Inc., Batavia, Ill.
Filed May 21, 1975, Ser. No. 579,305
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—233

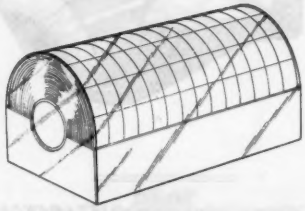


242,431
SIGN CLIP
Richard A. Carroll, North Providence, R.I., assignor to The Lorac Company, Inc.
Filed Apr. 7, 1975, Ser. No. 565,757
Term of patent 14 years
Int. Cl. D8—*08*
U.S. Cl. D8—243

242,432
JUG
Marten Gottsegen, 1212 Lake Shore Drive, Chicago, Ill. 60610
Filed Jan. 6, 1975, Ser. No. 538,711
Term of patent 14 years
Int. Cl. D9—*01*
U.S. Cl. D9—39

242,433
PACKAGE OF LABEL ROLLS
Thomas M. Smith, Dayton, Ohio, assignor to Monarch Marking Systems, Inc., Dayton, Ohio
Filed Sept. 9, 1974, Ser. No. 502,571
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D9—193

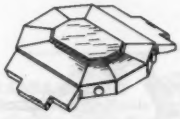
Disclosure was also published under the second Trial Voluntary Protest Program on Apr. 6, 1976



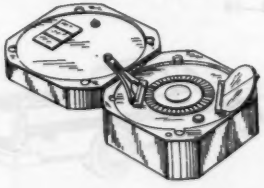
242,434
REVOLVING-INDICATOR WORLD TIME CLOCK
Charlcia Fern Knowles, 329 Wildbriar Drive, Garland, Tex. 75041
Filed Apr. 29, 1975, Ser. No. 572,657
Term of patent 14 years
Int. Cl. D10—*01*
U.S. Cl. D10—10

242,435
CLOCK
James A. Warner, 20 Elmore St., Pittsburgh, Pa. 15219
Filed Sept. 2, 1975, Ser. No. 609,602
Term of patent 14 years
Int. Cl. D10—*01*
U.S. Cl. D10—21

242,436
CASING FOR AN ELECTRONIC WATCH OR THE LIKE
Brent Nilson, San Jose, Calif., assignor to Fairchild Camera and Instrument Corporation
Filed July 7, 1975, Ser. No. 593,338
Term of patent 14 years
Int. Cl. D10—*02*
U.S. Cl. D10—30



242,437
DIGITAL DISPLAY COMPASS
Melvin G. Kramer, Riverton, Wyoming, assignor to The Brunton Company, Riverton, Wyo.
Filed Jan. 15. 1975, Ser. No. 541,157
Term of patent 14 years
Int. Cl. D10—*04*
U.S. Cl. D10—68

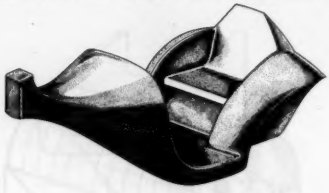


242,438
DISASTER ALARM CABINET
James L. Kissel, 2204 Cedar Drive, Rapid City, S. Dak. 57701
Filed Sept. 2, 1975, Ser. No. 609,398
Term of patent 14 years
Int. Cl. D10—*06*
U.S. Cl. D10—106

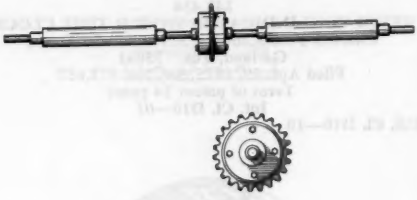
242,439
GOLF CART
Henry O. Gervais, Mountaintop, Pa., assignor to Hybrid Systems, Ltd.
Filed Apr. 4, 1975, Ser. No. 565,096
Term of patent 14 years
Int. Cl. D12—*14*
U.S. Cl. D12—16

242,440
PICKUP TRUCK OR THE LIKE
Miklos Goldberger, 1663 20th St., Santa Monica, Calif. 90404
Filed Feb. 10, 1975, Ser. No. 548,771
Term of patent 14 years
Int. Cl. D12—*08*
U.S. Cl. D12—98

242,441
TRICYCLE BODY
Joseph J. Nagle, Ten Rod Road, Rochester, N.H. 02867
Filed Oct. 24, 1975, Ser. No. 625,499
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D12—112

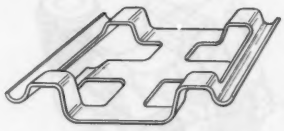


242,442
CYCLE DIFFERENTIAL AXLE
Lynden H. Garrison, 305 N. Orchid, Ellenton, Fla. 33532
Filed May 22, 1975, Ser. No. 579,853
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D12—114

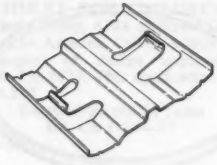


242,443
SPROCKET
John C. McGregor, Sr., 252 N. Broadmoor Blvd., Daniel P. McGregor, 1505 N. Lowry Ave., and James B. McGregor, 622 Snowhill Blvd., all of Springfield, Ohio 45504
Filed June 9, 1975, Ser. No. 585,336
Term of patent 14 years
Int. Cl. D12—*11*
U.S. Cl. D12—123

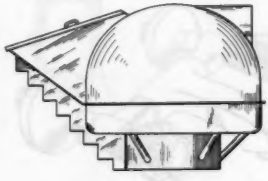
242,444
PAD HOLD-DOWN SPRING FOR A DISC BRAKE
Reinhard Holper, Leuterod, Germany, assignor to Girling Limited, Birmingham, England
Filed May 9, 1975, Ser. No. 576,118
Claims priority, application Great Britain Nov. 27, 1974
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—180



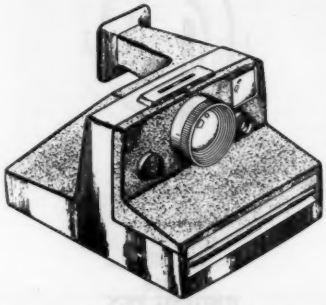
242,445
PAD ANTI-RATTLE SPRING FOR A DISC BRAKE
Norbert Kolb, Neuwied, Germany, assignor to Girling Limited, Birmingham, England
Filed May 9, 1975, Ser. No. 576,119
Claims priority, application Great Britain Nov. 27, 1974
Term of patent 14 years
Int. Cl. D12—*16*
U.S. Cl. D12—180



242,446
STORM SHELTER
David Franklin McNabb, Catoosa, Okla., assignor to Safe-T-Bath, Tulsa, Okla.
Filed May 29, 1975, Ser. No. 581,831
Term of patent 14 years
Int. Cl. D25—*03*
U.S. Cl. D25—36



242,447
PHOTOGRAPHIC CAMERA OR SIMILAR ARTICLE
James M. Conner, Mamaroneck, N.Y., and Donald H. Hendry, Rockland, and Bruce K. Johnson, Andover, Mass., assignors to Polaroid Corporation
Continuation-in-part of design application Ser. No. 554,763, Mar. 3, 1975. This application May 27, 1975, Ser. No. 581,114
Term of patent 14 years
Int. Cl. D16—*01*
U.S. Cl. D16—1

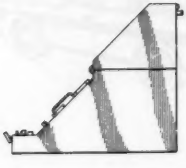


242,448
TRANSPARENCY VIEWER
Paul Tairraz, La Veyrianne-Route du Cret des Vignes, Veyrier du Lac (Haute-Savoie), France
Filed Dec. 29, 1975, Ser. No. 645,077
Claims priority, application France July 1, 1975
Term of patent 14 years
Int. Cl. D16—*02*
U.S. Cl. D16—14

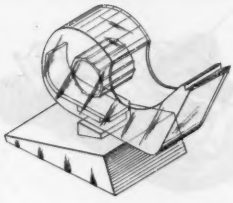
242,449
WRITING PEN
Rudi Jahraus, Keltern-Ellmendingen, Germany, assignor to Moriz Hausch GmbH
Filed Mar. 17, 1975, Ser. No. 558,788
Claims priority, application Germany Oct. 11, 1974
Term of patent 14 years
Int. Cl. D19—*06*
U.S. Cl. D19—45

242,450
WRITING PEN
Rudi Jahraus, Keltern-Ellmendingen, Germany, assignor to Moriz Hausch GmbH
Filed Apr. 21, 1975, Ser. No. 569,957
Term of patent 14 years
Int. Cl. D19—*06*
U.S. Cl. D19—45

242,451
INSTRUMENT CASE FOR A NUMERICAL TRAINING SIMULATOR OR THE LIKE
Mario Zamora, Houston, Tex., assignor to Haliburton Company
Filed May 28, 1975, Ser. No. 581,554
Term of patent 14 years
Int. Cl. D19—*07*
U.S. Cl. D19—60

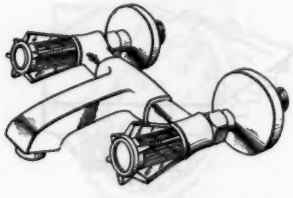


242,452
ROLL TAPE DISPENSER
Robert C. Brown Sr., 210 Prospect, Vallejo, Calif. 98225
Filed Feb. 21, 1975, Ser. No. 551,823
Term of patent 14 years
Int. Cl. D19—*02*
U.S. Cl. D19—69

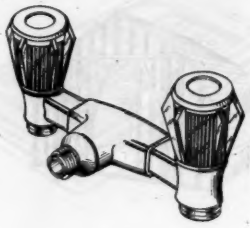


242,453
EQUATOR PROFILE RING FOR SPHERICAL TANKS
Arne Tönnessen, Moss, Norway, assignor to Moss Rosenberg, Verft A/S, Moss, Norway
Filed Oct. 23, 1975, Ser. No. 625,146
Claims priority, application Norway Apr. 24, 1975
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—2

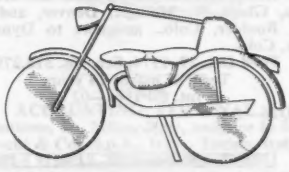
242,454
FAUCET
Wilfred Lewis Jones, Halesowen, England, assignor to IMI Opella, Limited, Birmingham, England
Filed June 10, 1975, Ser. No. 585,576
Claims priority, application Great Britain Feb. 24, 1975
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—26

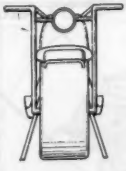


242,455
FAUCET BODY
Wilfred Lewis Jones, Halesowen, England, assignor to IMI Opella Limited, Birmingham, England
Filed June 10, 1975, Ser. No. 585,580
Claims priority, application Great Britain Feb. 24, 1975
Term of patent 14 years
Int. Cl. D23—*01*
U.S. Cl. D23—32



242,456
TOILET FOR CHILDREN
Lucinda Willis, 4108 Hillcrest Drive, Los Angeles, Calif. 90008
Continuation-in-part of design application Ser. No. 549,538, Feb. 13, 1975. This application Aug. 11, 1975, Ser. No. 603,285
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D23—53

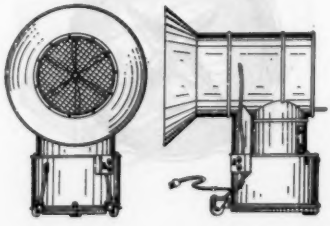




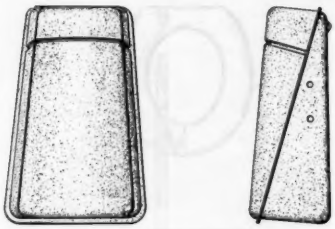
242,457
RAISED SUPERIMPOSED TOILET SEAT OR THE LIKE
Kurt Landsberger, 103 Harrison St., Verona, N.J. 07044
Filed Feb. 9, 1976, Ser. No. 656,749
Term of patent 14 years
Int. Cl. D23—*02*
U.S. Cl. D23—71

242,458
INCENSE BURNER
Clifton G. Mosely, 529 41st St., #10, Oakland, Calif. 94608
Filed Sept. 29, 1975, Ser. No. 617,947
Term of patent 14 years
Int. Cl. D31—*00*
U.S. Cl. D23—78

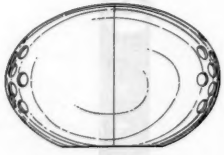
242,459
DUST COLLECTOR
Joseph J. Gerst, 8325 Belair Road, Baltimore, Md. 21236
Filed Nov. 7, 1974, Ser. No. 521,892
Term of patent 14 years
Int. Cl. D23—*04*
U.S. Cl. D23—149



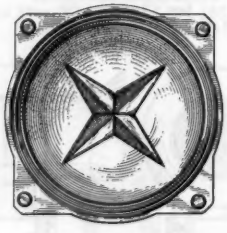
242,460
DEODORANT CONTAINER OR THE LIKE
Raymond P. Stoy, Westport, Conn., assignor to American Home Products Corp., New York, N.Y.
Filed Aug. 13, 1975, Ser. No. 604,288
Term of patent 14 years
Int. Cl. D23—*04*
U.S. Cl. D23—150



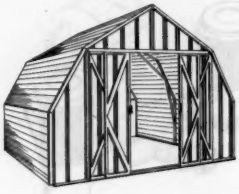
242,461
CONTAINER FOR DEODORANTS OR THE LIKE
Hugh R. Seymour Davies, London, England, assignor to Brookline Delta Limited, London, England
Filed Nov. 4, 1975, Ser. No. 628,806
Claims priority, application Great Britain May 9, 1975
Term of patent 3½ years
Int. Cl. D23—*04*
U.S. Cl. D23—150



242,462
COVER FOR A VENT OPENING
Sidney J. Shames, 57 Holly Place, Briarcliff Manor, N.Y. 10510, and Harold Shames, 5 Agnes Circle, Ardsley, N.Y. 10502
Filed Dec. 22, 1975, Ser. No. 643,093
Term of patent 14 years
Int. Cl. D23—*04*
U.S. Cl. D23—154

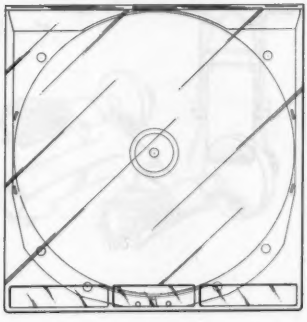


242,463
LAWN BUILDING OR SIMILAR CONSTRUCTION
James T. Cribben, Mechanicsburg, Pa., assignor to Capitol Products Corporation, Mechanicsburg, Pa.
Filed Aug. 2, 1974, Ser. No. 494,282
Term of patent 14 years
The term of this patent subsequent to Dec. 17, 1988, has been disclaimed
Int. Cl. D25—*03*
U.S. Cl. D25—24



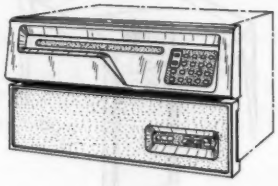
242,464
ELECTRICAL PLUG
Higenia Acosta, 332 E. 14th St., New York, N.Y. 10003
Filed Oct. 16, 1975, Ser. No. 623,064
Term of patent 14 years
Int. Cl. D13—*03*
U.S. Cl. D26—1 B

242,465
DISC CARTRIDGE FOR DATA PROCESSING EQUIPMENT
Robert F. Heidecker, Longmont, Albin Kenneth Johnson, Arvada, Glenn W. Monigle, Denver, and Galen B. Royer, Boulder, Colo., assignors to Dynastor, Inc., Denver, Colo.
Filed Oct. 29, 1974, Ser. No. 518,279
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D26—5 C

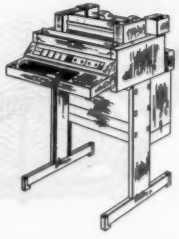


242,466
ELECTRONIC CALCULATING MACHINE
Isao Kitai, Osaka, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan
Filed Feb. 18, 1975, Ser. No. 550,719
Claims priority, application Japan Aug. 19, 1974
Term of patent 14 years
Int. Cl. D18—*01*
U.S. Cl. D26—5 C

242,467
FRONT PANEL FOR A COMPUTER CONSOLE
Paul A. Jenkins, Groton, Mass., assignor to Digital Equipment Corporation, Maynard, Mass.
Filed Mar. 6, 1975, Ser. No. 555,916
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D26—5 C



242,468
ACCOUNTING TERMINAL
Ettore Sottsass, Jr., Milan, Italy, assignor to Ing. C. Olivetti & Co., S.p.A., Ivrea, Torino, Italy
Filed Mar. 12, 1975, Ser. No. 557,741
Claims priority, application Italy Sept. 18, 1974
Term of patent 14 years
Int. Cl. D18—*01*
U.S. Cl. D26—5 C



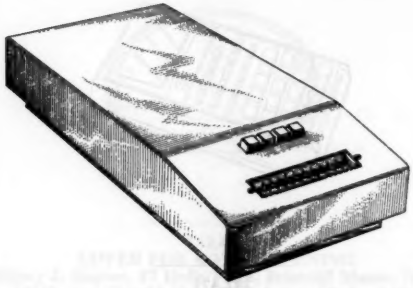
242,469
TELLER STATION
Dagmar L. Arnold, Woodstock, N.Y., and Dallas G. Molerin, and Philip C. Yenerich, San Jose, Calif., assignors to International Business Machines Corporation, Armonk, N.Y.
Filed June 9, 1975, Ser. No. 584,786
Term of patent 14 years
Int. Cl. D14—*02*
U.S. Cl. D26—5 C

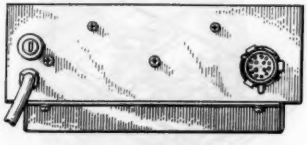
242,470
ELECTRONIC CALCULATING MACHINE
Isao Kitai, Osaka, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan
Filed Nov. 28, 1975, Ser. No. 636,123
Claims priority, application Japan June 4, 1975
Term of patent 14 years
Int. Cl. D18—*01*
U.S. Cl. D26—5 C

242,471
ELECTRONIC CALCULATING MACHINE
Isao Kitai, Osaka, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan
Filed Nov. 28, 1975, Ser. No. 636,124
Claims priority, application Japan June 4, 1975
Term of patent 14 years
Int. Cl. D18—*01*
U.S. Cl. D26—5 C

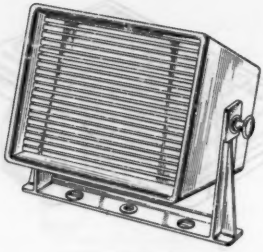
242,472
ELECTRONIC CALCULATING MACHINE
Katsumi Jinbo, Osaka, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan
Filed Dec. 22, 1975, Ser. No. 643,397
Claims priority, application Japan July 4, 1975
Term of patent 14 years
Int. Cl. D18—*01*
U.S. Cl. D26—5 C

242,473
TELEPHONE CALL DIVERTER
Arthur J. Pulos, Fayetteville, and Joseph C. Moro, Syracuse, N.Y., assignors to Dictaphone Corporation
Filed Jan. 6, 1975, Ser. No. 538,566
Term of patent 14 years
Int. Cl. D14—*03*
U.S. Cl. D26—14 A



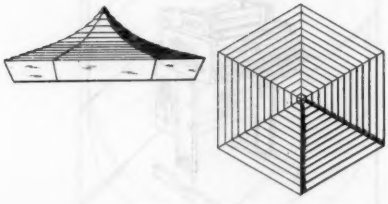


242,474
LOUDSPEAKER
Robert E. Croup, Indianapolis, Ind., assignor to Acoustic Fiber Sound Systems, Inc., Indianapolis, Ind.
Filed Aug. 25, 1975, Ser. No. 607,215
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D26—14 G

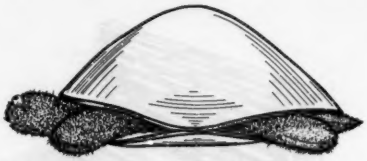


242,475
CIGARETTE LIGHTER
Jean Gaston Malamoud, Annecy, France, assignor to S. T. Dupont, Paris, France
Filed July 30, 1975, Ser. No. 600,230
Claims priority, application France Jan. 30, 1975
Term of patent 14 years
Int. Cl. D27—*05*
U.S. Cl. D27—42

242,476
COVER FOR AN AQUARIUM OR THE LIKE
Carol T. Beckman, 3200 College Ave., Quincy, Ill. 62301
Filed Apr. 22, 1975, Ser. No. 570,441
Term of patent 14 years
Int. Cl. D30—*02*
U.S. Cl. D30—12

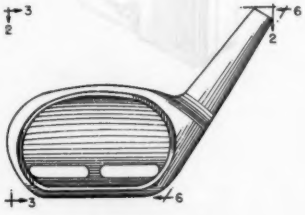


242,477
HAND PUPPET
Judith L. Folkmanis, 2212 Roosevelt Ave., Berkeley, Calif. 94703
Filed June 13, 1975, Ser. No. 586,492
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—2 C



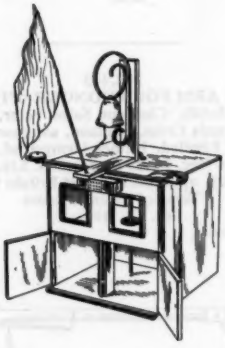
242,478
MARBLE GAME TABLE
Jimmie S. Howell, 81 W. Imperial Drive, Harahan, La. 70123
Filed Dec. 16, 1974 ,Ser. No. 533,341
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 J

242,479
GOLF BALL RETRIEVER
Gregory C. Panek, 5831 N. Lacey Ave., Chicago, Ill. 60646
Filed Mar. 31, 1975, Ser. No. 563,632
Term of patent 14 years
Int. Cl. D21—*02*
U.S. Cl. D34—5 CB

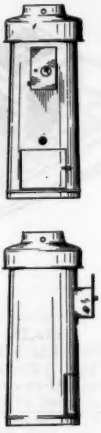


242,480
GAME DIE
Mitchell John Russell, 814 N. Delaware, San Mateo, Calif. 94010
Filed June 11, 1975, Ser. No. 585,787
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—5 DT

242,481
TOY FIRE STATION
Robert M. Farmer, 505 Harrison Drive, Wilson, N.C. 27893
Filed Oct. 16, 1974, Ser. No. 515,233
Term of patent 14 years
Int. Cl. D21—*01*
U.S. Cl. D34—15 LL

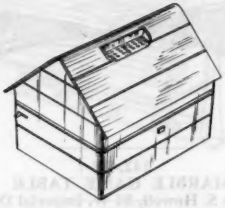


242,482
INDUSTRIAL VACUUM UNIT
Billy D. Fyffe, 7423 E. 30th St., Tulsa, Okla. 74129
Filed July 21, 1975, Ser. No. 597,716
Term of patent 14 years
Int. Cl. D7—*05*; D15—*05*
U.S. Cl. D15—54

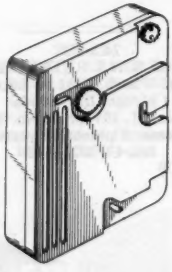


242,483
CLEANING ARM FOR PHONOGRAPH RECORDS
Philip Brian Arbib, Chalfont Saint Peter, and Richard Arbib, Gerrards Cross, England, assignors to Bib Hi-Fi Accessories Limited, Hemel Hempstead, England
Filed Dec. 26, 1974, Ser. No. 536,614
Claims priority, application Great Britain Sept. 2, 1974
Term of patent 7 years
Int. Cl. D14—*01*
U.S. Cl. D56—4 A

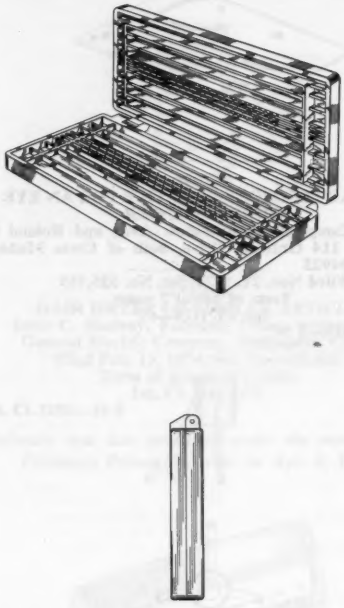
242,484
PHONOGRAPH HOUSING
Jack Friedman, New York, N.Y., assignor to L.J.N. Toys, Ltd., New York, N.Y.
Filed Apr. 3, 1975, Ser. No. 564,694
Term of patent 14 years
Int. Cl. D14—*01*
U.S. Cl. D56—4 R



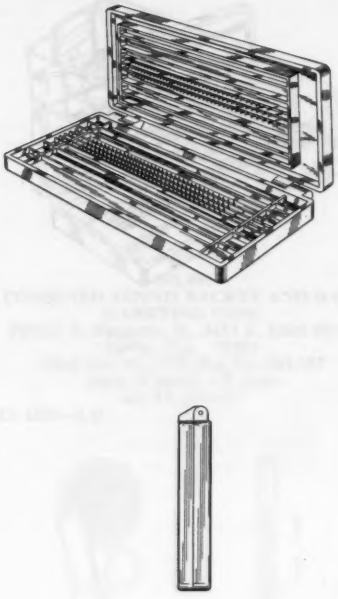
242,485
DISPOSABLE MICROFILM CARTRIDGE OR SIMILAR ARTICLE
George W. Bookless and Casimir S. Samczyk, Franklin Park, and Herman C. Schulz, Skokie, Ill., assignors to Bell & Howell Company, Chicago, Ill.
Filed Oct. 9, 1973, Ser. No. 404,533
Term of patent 14 years
Int. Cl. D16—*05*
U.S. Cl. D26—14 B



242,486
CHECK PERFORATOR
James Carroll Rice, 1 Pinecroft Road,
Asheville, N.C. 28804
Continuation-in-part of abandoned design application Ser. No. 318,880, Dec. 27, 1972. This application Dec. 11, 1974, Ser. No. 531,594
Term of patent 14 years
Int. Cl. D19—*02*
U.S. Cl. D64—10



242,487
CHECK PERFORATOR
James Carroll Rice, 1 Pinecroft Road,
Asheville, N.C. 28804
Continuation-in-part of abandoned design application Ser. No. 306,888, Nov. 15, 1972. This application Dec. 11, 1974, Ser. No. 531,595
Term of patent 14 years
Int. Cl. D19—*02*
U.S. Cl. D64—10

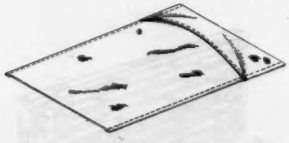


242,488
CHECK PERFORATOR
James Carroll Rice, 1 Pinecroft Road, Asheville, N.C. 28804
Continuation-in-part of abandoned design application Ser. No. 306,889, Nov. 15, 1972. This application Dec. 11, 1974, Ser. No. 531,596
Term of patent 14 years
Int. Cl. D19—*02*
U.S. Cl. D64—10

242,489
MOUTHPIECE FOR BREATH TESTING DEVICES OR THE LIKE
James E. Burroughs, Mount Prospect, Ill., assignor to Borg-Warner Corporation, Chicago, Ill.
Filed Jan. 2, 1974, Ser. No. 430,287
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D83—1 N

Disclosure was also published under the second Trial Voluntary Protest Program on Feb. 10, 1976

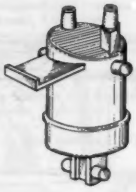
242,490
SURGICAL DRAPE
Nathan L. Belkin, Huntington, N.Y., assignor to Superior Surgical Mfg. Co., Inc., Huntington, N.Y.
Filed May 28, 1974, Ser. No. 473,339
Term of patent 14 years
Int. Cl. D24—*04*
U.S. Cl. D83—1 R



242,491
OCULAR POSITIONING DEVICE FOR AN EYE DROP DISPENSER
Gary J. Campagna, 236 Willow Ave., and Roland C. Janson, 114 Granada Drive, both of Corte Madera, Calif. 94925
Filed Nov. 21, 1974, Ser. No. 525,769
Term of patent 7 years
Int. Cl. D24—*02*
U.S. Cl. D83—1 N

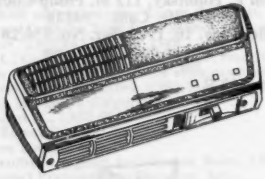
242,492
ORTHOPEDIC BRACE
Elmer M. Arluck, New York, N.Y., assignor to Thermo-Mold Medical Products, Inc., New York, N.Y.
Filed Apr. 19, 1976, Ser. No. 678,255
Term of patent 14 years
Int. Cl. D24—*04*
U.S. Cl. D83—1 J

242,493
DISPOSABLE SYRINGE FOR FLUID DELIVERY APPARATUS
Stephen H. O'Leary, San Diego, Calif., assignor to IVAC Corporation, San Diego, Calif.
Filed Sept. 26, 1974, Ser. No. 509,558
Term of patent 14 years
Int. Cl. D24—*02*
U.S. Cl. D83—12 A



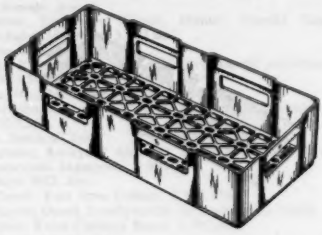
242,494
HAIR DRYER OR SIMILAR ARTICLE
John C. Shalvoy, Fairfield, Conn., assignor to General Electric Company, Bridgeport, Conn.
Filed Feb. 19, 1974, Ser. No. 443,446
Term of patent 3½ years
Int. Cl. D28—*03*
U.S. Cl. D86—10 F

Disclosure was also published under the second Trial Voluntary Protest Program on Apr. 6, 1976

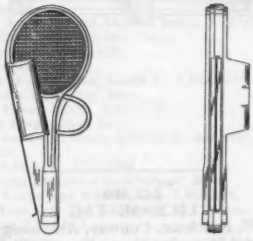


242,495
MAKEUP POT
Robin M. Montgomery, Sherman Oaks, Calif., assignor to Max Factor & Co., Hollywood. Calif.
Filed Apr. 28, 1975, Ser. No. 572,155
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D86—10 A

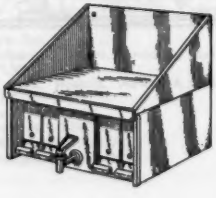
242,496
BAKERY TRAY OR THE LIKE
James C. Carroll and Lewis T. Johnson, Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.
Filed July 29, 1974, Ser. No. 492,829
Term of patent 14 years
Int. Cl. D9—*03*
U.S. Cl. D87—1 R



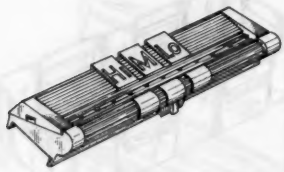
242,497
COMBINED TENNIS RACKET AND BALL CARRYING CASE
Patrick E. Haggerty, Jr., 3411 E. Kiest Blvd., Dallas, Tex. 75203
Filed May 30, 1975, Ser. No. 582,107
Term of patent 3½ years
Int. Cl. D3—*02*
U.S. Cl. D87—1 R



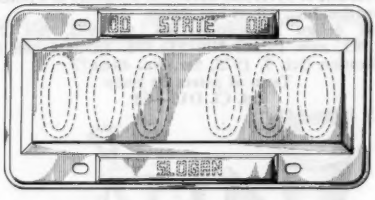
242,498
WALL-MOUNTED BEVERAGE DISPENSER
Martelle J. Syverson, Albert Lea, Minn., and David B. Syverson and Jon R. Syverson, executors of the estate of Martelle J. Syverson, deceased, assignors to Fountain Industries, Inc., Albert Lea, Minn.
Original design application Jan. 6, 1972, Ser. No. 215,987, now Patent No. 231,575. Divided and this application Oct. 9, 1973, Ser. No. 404,672
Term of patent 14 years
Int. Cl. D15—*08*
U.S. Cl. D15—112



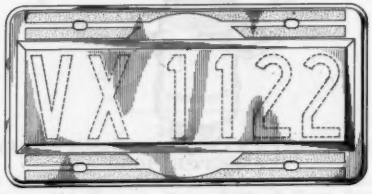
242,499
ADJUSTABLE SAFETY RAZOR CARTRIDGE
Martin Glaberson, Stratford, Conn., assignor to Warner-Lambert Company, Morris Plains, N.J.
Continuation-in-part of abandoned design application Ser. No. 526,081, Nov. 22, 1974. This application May 22, 1975, Ser. No. 580,094
Term of patent 14 years
Int. Cl. D28—*03*
U.S. Cl. D95—3 B



242,500
LICENSE TAG
James V. Bruckner, Conway, Ark, assignor to Metal Stamping Corp., Conway, Ark.
Filed Oct. 16, 1975, Ser. No. 622,243
Term of patent 14 years
Int. Cl. D20—*03*
U.S. Cl. D96—12 E



242,501
LICENSE PLATE
James V. Bruckner, Conway, Ark., assignor to Metal Stamping Corp., Conway, Ark.
Filed Oct. 16, 1975, Ser. No. 622,244
Term of patent 14 years
Int. Cl. D20—*03*
U.S. Cl. D96—12 E



242,502
SIGN
John E. Hubitsky, 112 St. Philip Court, Danville, Calif. 94526
Filed Nov. 10, 1975, Ser. No. 630,281
Term of patent 14 years
Int. Cl. D20—*03*
U.S. Cl. D96—12 R

LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 23RD DAY OF NOVEMBER, 1976

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Adair, James G., to Phillips Petroleum Company. Control system for dynamic extruder. 3,993,421, Cl. 425-145.000.

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Aguet, Emile, to Sulzer Brothers Limited. Combined gas turbine and steam power plant. 3,992,876, Cl. 60-39.120.

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Ahrweiler, Karl-Heinz; Quoos, Kurt; Kusters, Eduard; and Appenzeller, Valentin, to Kusters, Eduard. Continuous press having improved anti-friction rollers. 3,993,426, Cl. 425-371.000.

Aihara, Tetsuo; Watanabe, Tadashi; Nakayama, Yasuharu; Yamashita, Yoshio; and Toyomoto, Isao, to Kansai Paint Company, Ltd. Aqueous coating composition. 3,993,612, Cl. 260-23.70A.

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Alt, Robert D.; and Huebner, Charles H., to General Motors Corporation. System for preventing drive train start of a motor vehicle internal combustion engine. 3,993,038, Cl. 123-198.0DB.

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Alza Corporation: *See—*
Buckles, Richard G.; Leeper, Harold M.; Yum, Su Il; and Michaels, Alan S., 3,993,069.
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Andre, Jacques Maurice Jules Ghislain; Cahen, Raymond Marc; Debus, Henri Robert; Lammers, Rene Odon; and Van Thillo, Hugo Johannes, to Labofina S.A. Preparation of spheroidal alumina particles. 3,993,596, Cl. 252-448.000.

Andre, Jacques Maurice Jules Ghislain: *See—*
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Babcock, Guy L.; Bryant, Walter M.; Neugebauer, Constantine A.; and Burgess, James F., to General Electric Company. Bonds between metal and a non-metallic substrate. 3,993,411, Cl. 403-271.000.
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Bachelder, Albert J., to Polaroid Corporation. Photographic apparatus and process. 3,994,004, Cl. 354-202.000.
Bachmann, Horst, to Langenstein & Schemann Aktiengesellschaft. Wedge press. 3,992,920, Cl. 72-452.000.
Back, Paul Roger; Fraleigh, Robert James; and Albano, Rocco Vincent, to United Technologies Corporation. Engine cylinder identification. 3,992,930, Cl. 73-117.300.
Badat, Alois; and Hruby, Peter, to Orion Werke AG. Frameless housing. 3,992,840, Cl. 52-285.000.
Baensch, Hans; and Burger, Hans, to Ulrich Baensch. Device for feeding fish. 3,993,028, Cl. 119-51.00R.
Baer, Ralph H., to Sanders Associates, Inc. Digital video modulation and demodulation system. 3,993,861, Cl. 178-5.600.
Baermann, Max, to Gulf & Western Industries, Inc. Magnetic return device for reset timer/counter unit and reset timer/counter unit using same. 3,993,895, Cl. 235-144.0ME.
Baggiolini, Enrico: *See—*
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Balcewicz, Joseph Francis, to RCA Corporation. Minimum shift keying communication system. 3,993,868, Cl. 178-66.00R.
Ballou, David G., to Dayco Corporation. Method of making endless power transmission belt structure. 3,993,522, Cl. 156-137.000.
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Barr, Samuel R., to United States of America, Army. Particle separator for turbine engines of aircraft. 3,993,463, Cl. 55-306.000.
Barrett, Donald. Ladder socks. 3,993,163, Cl. 182-108.000.
Barron, Benny Gene, to Dow Chemical Company, The. Mixtures of high and low molecular weight polyols resistant to phase separation. 3,993,576, Cl. 252-182.000.
Bartell, Roger Edwin, to Eastman Kodak Company. Web slack box having a plurality of sections. 3,993,233, Cl. 226-118.000.
Bartels, Bruce; Holtrop, John W.; Liedtke, Larry L.; and Trovinger, Russell T., to United States of America, Navy. Liquid propellant gun. 3,992,976, Cl. 89-7.000.
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Beard, Colin C.; Edwards, John A.; and Fried, John H., to Syntex (U.S.A.) Inc. 1,5(6)-Disubstituted benzimidazole-2-carbamate derivatives having anthelmintic activity. 3,993,769, Cl. 424-273.000.
Bechara, Ibrahim S.; Carroll, Felix P.; Mascioli, Rocco L.; and Panchak, John R., to Air Products and Chemicals, Inc. Cyclic quaternary hydroxyalkyl phenoxide catalysts for isocyanate reactions. 3,993,652, Cl. 260-268.0BF.
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Bellavin, Peter N., deceased (by Bellavin, Anna K., legal representative), to United States of America, Navy. Thixotropic chemical conversion material for corrosion protection of aluminum and aluminum alloys. 3,993,510, Cl. 148-6.200.

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Bennett, Richard C. Transporting system. 3,993,344, Cl. 296-35.00A.

Bennett, Robert S.: *See—*
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Bentley, Charles A. Deck structure and connector for building construction. 3,993,341, Cl. 294-89.000.

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Bergentz, Sven Erik; and Strid, Kurt Sven Theodore, to Gambro AG. Insert for use preferably in vascular surgery. 3,993,078, Cl. 128-334.00R.

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Birkhold, James A., to Olsen Manufacturing Company, Inc. Spin welding apparatus and method. 3,993,519, Cl. 156-73.500.

Biswas, Ranjit, to Thomas & Betts Corporation. Connector for flexible metallic raceway. 3,993,333, Cl. 285-45.000.

Bjorkman, Harry K., Jr., to Energy Development Associates. Metal halogen hydrate battery system. 3,993,502, Cl. 429-51.000.

Black, Stanley A.; and Jenkins, James F., to United States of America, Navy. Method for production of heat and hydrogen gas. 3,993,577, Cl. 252-188.000.

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Blum, Pierre; and Viguie, Jean-Claude, to Commissariat a l'Energie Atomique. Cell for electrolysis of steam at high temperature. 3,993,653, Cl. 204-272.000.

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Bodin, Ove. Hydraulic circuit. 3,992,882, Cl. 60-413.000.

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Bokelmann, Horst, to Metzeler Schaum Gesellschaft mit beschrankter Haftung. Machine for the continuous reverse-coating of sheet-form material with polyurethane foam. 3,993,025, Cl. 118-642.000.

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Bonis, Laszlo J. Laminated plastic sheeting and containers made therefrom. 3,993,810, Cl. 428-35.000.

Bonnefon, Alain, to Pneumatiques, Caoutchouc Manufacture et Plastiques Kleber-Colombes. Transmission belt. 3,992,958, Cl. 74-231.00R.

Bontinck, Walter; and De Coster, Willy, to U.C.B., Societe Anonyme. Method of manufacturing an artificial paper. 3,993,718, Cl. 264-22.000.

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Brcic, Mario. Steel cutting machine. 3,992,968, Cl. 83-468.000.
Brechbuhler, Hans U.; and Petitpierre, Jean Claude, to Ciba-Geigy Corporation. Insecticidal n-(substituted phenyl)-tricyclo [3,2,2,0^{2,4}]nonane-6,7-dicarboximides. 3,993,662, Cl. 260-326.00C.
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Brinkman, Heinz, to Hermann Berstorff Maschinenbau GmbH. Apparatus for plasticizing material such as rubber, synthetic plastics and like plasticizable compositions. 3,993,291, Cl. 259-185.000.
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Brook, Greville Bertram; and Bowyer, William Henry, to Fulmer Research Institute Limited. Bonding of aluminium alloys. 3,993,238, Cl. 228-198.000.
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Brosh, Amnon; and Wasserman, Jacob, to Kulite Semiconductor Products, Inc. Economical weighing apparatus employing a cantilever beam structure. 3,993,150, Cl. 177-211.000.
Brown, Alexander M. Method of forming a slide fastener. 3,993,725, Cl. 264-145.000.
Brown, Edward Leslie. Intermittent time controlled vapor dispensing device. 3,993,444, Cl. 21-126.000.
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Brown, Kenard D. Mounting and lubricating system for rotating machinery. 3,993,164, Cl. 184-6.000.
Brown, Otice E.; and White, Richard D., to Globe Universal Sciences, Inc. Connector. 3,993,392, Cl. 339-98.000.
Brown, Robert L.: *See—*
Henley, Virgil E.; Jellison, Frank R.; and Brown, Robert L., 3,993,530.
Brown, Roderick B. Insulated fitting sheath for eyeglass temples. 3,993,403, Cl. 351-178.000.
Brown & Root, Inc.: *See—*
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Browne, Arthur; and Witts, Francis John, to U.S. Philips Corporation. Scanning systems. 3,993,865, Cl. 178-7.600.
Brownell, Richard Miller, to Bell Telephone Laboratories, Incorporated. Coaxial cable switch. 3,993,970, Cl. 335-5.000.
Broyles, David R. Nail straightener. 3,992,918, Cl. 72-416.000.
Brunetti, Heimo, to Ciba-Geigy Corporation. Bis-salicyloyl-hydrazine as stabilizer for polymers. 3,993,622, Cl. 260-45.9NC.
Brunner, Josef Klemens. Process for separation of monocarboxylic acids from a mixture of monocarboxylic, hydroxycarboxylic and dicarboxylic acids. 3,993,691, Cl. 260-535.00R.
Brunno, Roberto, to Dalmine S.p.A. Anticorrosion zinc based coating material. 3,993,482, Cl. 75-178.00A.
Bruns, Klaus; and Meins, Peter, to Henkel & Cie G.m.b.H. Odoriferous cycloalkyl acetals. 3,993,697, Cl. 260-611.00R.
Bryant, Walter M.: *See—*
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Buchan, William R.; and Moore, Robert A., to Itek Corporation. Electrophotographic toner transfer and fusing apparatus and method. 3,993,825, Cl. 428-216.000.
Buchel, Karl Heinz; Kramer, Wolfgang; and Plempel, Manfred, to Bayer Aktiengesellschaft. 1-Propyl-triazolyl antimycotic compositions and methods of treating mycoses. 3,993,765, Cl. 424-269.000.
Buchel, Karl Heinz: *See—*
Wenzelburger, Jurgen; Buchel, Karl Heinz; Plempel, Manfred; and Meiser, Werner, 3,993,647.
Buck, George Sumner, Jr.; Weyker, Robert George; and Ward, Arthur Gerhard. Cotton batt and method for producing such. 3,993,518, Cl. 156-62.600.
Buckles, Richard G.; Leeper, Harold M.; Yum, Su Il; and Michaels, Alan S., to Alza Corporation. Liquid delivery device bladder. 3,993,069, Cl. 128-214.00F.
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Bukovitz, Ronald Francis; and Lindstedt, Ernst Lennart, to Ingersoll-Rand Company. Angle drilling apparatus. 3,992,831, Cl. 52-116.000.
Bunn, Christopher Brian. Pipeline weight container and method. 3,993,192, Cl. 206-515.000.
Bunnell, Lee Roy; and Bates, J. Lambert, to United States of America, Energy Research and Development Administration. Method of encapsulating solid radioactive waste material for storage. 3,993,579, Cl. 252-301.10W.
Burdett, Harold D. Process and apparatus for forming modular building structures. 3,993,720, Cl. 264-33.000.
Burgaud, Philippe, to Solvay & Cie. Photodegradable vinyl chloride polymer containing a ferrocene and an α-phenyl indole. 3,993,634, Cl. 526-4.000.
Burge, George W.; and Madsen, Richard A., to McDonnell Douglas Corporation. Thermally insulated cryogenic container. 3,993,213, Cl. 220-9.0LG.
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Burgiss, Samuel G., to Corning Glass Works. Circuit for rewriting blocks of phase encoded data. 3,994,014, Cl. 360-42.000.
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Burke, Hubert K.; and Michon, Gerald J., to General Electric Company. Solid state imaging apparatus. 3,993,897, Cl. 250-211.00J.
Burke, Noel I., to Tee-Pak Inc. Process of making collagen casings using mixed acids. 3,993,790, Cl. 426-277.000.
Burnside, Walter M., to Bally Manufacturing Corporation. Changeable display apparatus. 3,993,312, Cl. 273-121.00A.
Burr, Alan C., to Howe Furniture Corporation. Table leg and supporting structure. 3,993,005, Cl. 108-156.000.
Burrer, Gordon J.; and Robillard, Gene A., to Honeywell Inc. Method for fabricating lead through for Dewar flask. 3,992,774, Cl. 29-628.000.
Burroughs Corporation: *See—*
Beck, Gary Randall; and Quave, Ronald Carlos, 3,993,891.
Burton, George; and Watson, Elzbieta, to Beecham Group Limited. Cephalosporin compounds. 3,993,758, Cl. 424-246.000.
Burton, Vance P.: *See—*
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Bush, Richard W.; and Wood, Louis L., to W. R. Grace & Co. Curable solid adducts of polyene-polythiol compositions with urea. 3,993,549, Cl. 204-159.220.
Buss, Russel A.; and Stacy, Galen D., to Phillips Petroleum Company. Apparatus and method for control of carbon black reactor. 3,993,447, Cl. 23-259.500.
Butler, Geoffrey Langford; and Gratton, Brian, to Adhesive Tapes Limited. Pressure-sensitive adhesive tape substrate. 3,993,826, Cl. 428-220.000.
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Andre, Jacques Maurice Jules Ghislain; Cahen, Raymond Marc; Debus, Henri Robert; Lammers, Rene Odon; and Van Thillo, Hugo Johannes, 3,993,590.
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Calabria, Valerio: *See—*
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Calgon Corporation: *See—*
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Caligiuri, Joseph M. Lockable garment display rack. 3,993,195, Cl. 211-7.000.

Calkins Manufacturing Company: *See—*
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Callender, Robert E., to United States of America, Army. Mounting technique for thin film Schottky barrier photodiodes. 3,993,800, Cl. 427-74.000.

Calspan Corporation: *See—*
Fellman, Daniel J., 3,993,888.

Camardella, Giuseppe. Method of tinning coil terminals. 3,993,803, Cl. 427-117.000.

Cambell, John G.: *See—*
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Campbell, Robert J., to Avco Corporation. Plural stage freeze crystallization with wash-water/concentrate interface control. 3,992,900, Cl. 62-541.000.

Canada, Her Majesty the Queen in right of, as represented by the Minister of National Defence: *See—*
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Candor, James T. Frame construction for a plural page document. 3,992,793, Cl. 40-102.000.

Canon Kabushiki Kaisha: *See—*
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Carlson, Robert C., to Minnesota Mining and Manufacturing Company. Sulfonated aromatic polyisocyanates and preparation of stable anionic polyurethane or polyurea latices therefor. 3,993,614, Cl. 260-29.2TN.

Carmel Energy, Inc.: *See—*
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Carnegie-Mellon University: *See—*
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Carney, Richard William James; and deStevens, George, to Ciba-Geigy Corporation. Tertiary aminoacids as anti-inflammatory agents. 3,993,763, Cl. 424-267.000.

Carp, Ralph W.: *See—*
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Carrick, Lawrence K., to Calkins Manufacturing Company. Boat trailer. 3,993,324, Cl. 280-414.00R.

Carrier Corporation: *See—*
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Carroll, Felix P.: *See—*
Bechara, Ibrahim S.; Carroll, Felix P.; Mascioli, Rocco L.; and Panchak, John R., 3,993,652.

Carswell, James. Electric baby rocker. 3,992,731, Cl. 5-109.000.

Casio Computer Co., Ltd.: *See—*
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Cassarino, Frank V., Jr.; Barlow, George J.; Bekampis, George J.; Conway, John W.; Lemay, Richard A.; O'Keefe, David B.; Riikonen, Douglas L.; and Woods, William E., to Honeywell Information Systems, Inc. Apparatus for processing data transfer requests in a data processing system. 3,993,981, Cl. 340-172.500.

Cassella Farbwerke Mainkur Aktiengesellschaft: *See—*
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Cavender, Donald E., to Monarch Marking Systems, Inc. Web of record assemblies. 3,993,814, Cl. 428-40.000.

CEAC of Illinois, Inc.: *See—*
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Celanese Corporation: *See—*
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Cella, John A.; and Fiebig, August Emil, Jr., to Alberto Culver Company. Live human hair treatment compositions containing perfluorinated compounds. 3,993,744, Cl. 424-70.000.

Cella, John A.; Lukey, Robert A.; Fiebig, August Emil, Jr.; and Pum, Frank J., to Alberto Culver Company. Perfluorinated compounds in hair treatment compositions. 3,993,745, Cl. 424-71.000.

Central Glass Co., Ltd.: *See—*
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Centre Technique des Industries de la Fonderie: *See—*
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Cerny, Elizabeth A.: *See—*
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Cervisi, Richard Thomas. Box spring construction. 3,992,732, Cl. 5-263.000.

Ceskoslovenska komise pro atomovou energii: *See—*
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Champion International Corporation: *See—*
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Chandross, Edwin Arthur; Tomlinson, Walter John, III; and Weber, Heinz Paul, to Bell Telephone Laboratories, Incorporated. Photopolymerization process and related devices. 3,993,485, Cl. 96-27.00H.

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Chapman, Thomas Henry, to Gunson's Sortex Limited. Sorting machine with fiber optic focusing means. 3,993,899, Cl. 250-227.000.

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Chattopadhayay, Asoke; and Muller, Wolfgang. Fuel quantity distributor for multicylinder combustion engine. 3,993,033, Cl. 123-139.0BC.

Chemical Additives Company: *See—*
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Chepelev, Viktor Gavrilovich; Grinchenko, Nikolai Nikolaevich; Goldshtein, Jury Moiseevich; Shvarts, David Leonidovich; Fetisenko, Nikolai Pavlovich; and Grinchenko, Vladimir Nikolaevich. Apparatus for positioning a working implement in a borehole. 3,993,127, Cl. 166-66.000.

Cherbourg, Robert; and Soetaert, Guy, to Regie Nationale des Usines Renault; and Automobiles Peugeot. Sliding door release and actuating control device. 3,993,338, Cl. 292-336.300.

Cherbourg, Robert; and Soetaert, Guy, to Regie Nationale des Usines Renault; and Automobiles Peugeot. Plate-type door opening control device. 3,993,339, Cl. 292-336.300.

Cheskis, Harvey P.; and Shapiro, Stanley, to Olin Corporation. Copper base alloy. 3,993,479, Cl. 75-160.000.

Chevrier, Francois X.; and Jones, Leon, to FXC Corporation. Controlled actuator. 3,992,999, Cl. 102-70.00B.

Chevriot, Roland F.; Gonon, Marcel P.; Le Maux, Gilles; and Mangin, Daniel, to Centre Technique des Industries de la Fonderie; Sidelor, Wendel; and Industries Chimiques de Voreppe. Method for increasing the mechanical resistance of foundry moulds or cores made from a self-hardening liquid sand and a resin as binding agent. 3,993,117, Cl. 164-43.000.

Chevron Research Company: *See—*
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Neuman, Charles H., 3,993,903.
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Chew, Clarence E. Hydroponic unit. 3,992,809, Cl. 47-62.000.

Chiari, Natale; Calabria, Valerio; and Inverardi, Giuseppe, to Edera Officina Meccanica Tessile S.p.A. Doffing mechanism for spinning and twisting frames. 3,992,866, Cl. 57-53.000.

Chiba, Haruo; and Fujiki, Akiteru, to Sanwa Seiki Mfg. Co. Ltd. Antiskid device for use with vehicle brake systems. 3,993,364, Cl. 303-21.00F.

Chibana, Masanobu; and Futamase, Tsuyoshi, to Nippon Gakki Seizo Kabushiki Kaisha. Electronic musical instrument. 3,992,970, Cl. 84-1.110.

Chibana, Masanobu; and Futamase, Tsuyoshi, to Nippon Gakki Seizo Kabushiki Kaisha. Electronic musical instrument. 3,992,971, Cl. 84-1.110.

Chicago Rawhide Manufacturing Company: *See—*
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Childs, J. H., to City of North Olmsted. Apparatus for pollution abatement. 3,993,449, Cl. 23-277.00C.

Chimura, Kazuya; Kaneko, Takashi; Takashima, Shunichi; Nakazono, Ryuichi; Kawashima, Masao; Ota, Hiroyuki; Tamura, Kenji; Kagawa, Kazunori; Shimada, Kazushi; Maeda, Toru; Anzai, Hisao; Takoi, Kenji; and Sakunaga, Kenichi, to Mitsubishi Rayon Co., Ltd. Light transmitting filament. 3,993,834, Cl. 428-373.000.

Chinoin Gyogyszer-es Vegyeszeti Termekek Gyara RT: *See—*
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Chisolm, Randall N., to Lawrence Peska Associates, Inc., a part interest. Spring holder tool. 3,993,276, Cl. 248-352.000.

Chlortrol Inc.: *See—*
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Chopard, Remy; Portmann, Hubert; and Saurer, Eric, to Ebauches S.A. Indicator for the condition of a battery operating a timepiece. 3,993,985, Cl. 340-249.000.

Chopin, Alain: *See—*
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Chopin, Marie-Christine: *See—*
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Christ, Thomas; and Langguth, Robert P., to Monsanto Company. Builder compositions. 3,993,574, Cl. 252-89.00R.

Christensen Diamond Products Company: *See—*
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Christiansen, Keith W.: *See—*
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Chrysler Corporation: *See—*
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Chu, Richard C.; Gupta, Omkarnath R.; Hwang, Un-Pah; and Simons, Robert E., to International Business Machines Corporation. Gas encapsulated cooling module. 3,993,123, Cl. 165-80.000.

Chynoweth, Douglas John: *See—*
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Ciba-Geigy AG: *See—*
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Rasberger, Michael; and Rody, Jean, 3,993,655.
Schmidlin, Julius; and Biollaz, Michel, 3,993,644.

Cichowski, Robert S.; and Farha, Floyd E., Jr., to Phillips Petroleum Company. Oxidative dehydrogenation process. 3,993,591, Cl. 252-432.000.

Cicognani, Mario, to Industrie Pirelli S.p.A. Tension resistant structure for driving belts and the like. 3,992,959, Cl. 74-234.000.

Cities Service Company: *See—*
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Clark, John Campbell, to Strainstall Limited. Mooring device. 3,992,934, Cl. 73-143.000.

Clark, Llewellyn E.: *See—*
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Clarke Chapman Limited: *See—*
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Claudet, Gerard; Roubeau, Pierre; and Verdier, Jacques, to Commissariat a l'Energie Atomique. Method for the production of superfluid helium under pressure at very low temperature and an apparatus for carrying out said method. 3,992,893, Cl. 62-113.000.

Clausen, Jorgen, to Elektrogeno AS. Apparatus for grinding and polishing a welded seam. 3,992,818, Cl. 51-3.000.

Clauss, Karl: *See—*
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Clemens, Robert W.; and Schussel, Edward W., to Wesco Industries Corporation. Yarn measuring instrument. 3,992,936, Cl. 73-160.000.

Clorfeine, Alvin Seymour: *See—*
Kaplan, Gerald Stanley; and Clorfeine, Alvin Seymour, 3,993,995.

Coal Industry (Patents) Limited: *See—*
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COGAS Development Company: *See—*
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Coherent Radiation: *See—*
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Cole, Edward L.; and McMahon, Matthew A., to Texaco Inc. Process for desulfurizing pipelined coal. 3,993,456, Cl. 44-1.00R.

Colgate-Palmolive Company: *See—*
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Gaffar, Abdul; and Marcussen, Hans Wilhelm, Jr., 3,993,747.

Collins, Dean Robert, to Texas Instruments Incorporated. Wrist watch. 3,992,874, Cl. 58-50.00R.

Columbia Ribbon and Carbon Manufacturing Co., Inc.: *See—*
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Comer, William T.; and Roth, Herbert R., to Mead Johnson & Company. Anorexigenic process and composition. 3,993,776, Cl. 424-316.000.

Commissariat a l'Energie Atomique: *See—*
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Claudet, Gerard; Roubeau, Pierre; and Verdier, Jacques, 3,992,893.

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Concorde Fibers Inc.: *See—*
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Conley, Richard William, to Rockwell International Corporation. Double disc gate valve with entrapped stem connection. 3,993,285, Cl. 251-86.000.

Connell, Gordon Sidney; and Andriessen, Ronald Carl, to Formflo Limited. Rolling operations. 3,992,910, Cl. 72-7.000.

Connell, Gordon Sidney; and Andriessen, Ronald Carl, to Formflo Limited. Diametral control of rolled annular workpieces by weighing. 3,992,911, Cl. 72-7.000.

Connell, Gordon Sidney, to Formflo Limited. Rolling operations. 3,992,914, Cl. 72-106.000.

Connell, Gordon Sidney, to Formflo Limited. Split mandrel. 3,992,929, Cl. 72-106.000.

Connolly, Timothy J., to Raymond Lee Organization, Inc., The, a part interest. Store security system. 3,993,006, Cl. 109-1.00R.

Conrad, John H.; and Seemann, Joseph P., to Unican Security Systems, Ltd. Motor vehicle headlight control apparatus. 3,993,914, Cl. 307-10.0LS.

Consolidated Engravers Corporation: *See—*
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Consolidated Video Systems, Inc.: *See—*
Tallent, Michael W.; Scaggs, Lee E.; Swain, Allan L.; Harrison, Ronnie M.; and Hendershot, William B., III, 3,993,982.

Continental Oil Company: *See—*
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Cooke, Michael B. D.: *See—*
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Coomer, Roger W.; Marquis, Ray L.; and Beckman, Frank H., to Kalart Victor Corporation. Self-threading motion picture projector. 3,993,404, Cl. 352-157.000.

Cooper, Franklin D. Purification of coke oven gas with production of sulfuric acid and ammonium sulfate. 3,993,730, Cl. 423-225.000.

Cooper, James Brand, to Raychem Corporation. Connector half having connector wafer retained therein. 3,993,394, Cl. 339-136.00M.

Cope, Raymond, to Lucas Industries Limited. Fan drive systems. 3,992,883, Cl. 60-456.000.

Copeland, John Alexander, III; and Krambeck, Robert Harold, to Bell Telephone Laboratories, Incorporated. Functionally static type semiconductor shift register with half dynamic-half static stages. 3,993,916, Cl. 307-221.00C.

Copper Range Company: *See—*
Hay, Donald A.; Gregg, Peter T.; and Finlay, Walter L., 3,993,478.

Cordle, Paul E.; McCubbin, Melvin J.; Johnson, Clifford T.; and Brown, James K., to United States of America, Navy. Warhead, penetrating nose shape. 3,992,998, Cl. 102-56.00R.

Cornils, Boy: *See—*
Tummes, Hans; Cornils, Boy; Meis, Josef; Ernst, Dieter; and Tomuschat, Hans-Joachim, 3,993,695.

Corning Glass Works: *See—*
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Cory, Michael: *See—*
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Cosco, Robert J.; Pappas, John A.; and Hebert, Roger T., to GTE Sylvania Incorporated. Arc discharge lamp with integral trigger electrode. 3,993,922, Cl. 313-198.000.

Cosden Technology, Inc.: *See—*
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Costello, George P.: *See—*
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Cote, Rene. Bicycle hitch. 3,993,321, Cl. 280-204.000.

Coulter Electronics, Inc.: *See*—
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Courtaulds Limited: *See*—
Webb, Norman Stanley; and Dunbar, Gordon, 3,992,904.
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Khoylian, Rouzas R.; Haimberger, Hans G.; and Cowdery, James R., 3,993,189.
Cowen, Henry Chapman: *See*—
Longton, Peter Bryan; and Cowen, Henry Chapman, 3,993,540.
Cox, Dennis Thomas; Damerell, Justin Bruce; Kelly, Gilbert Joseph; and Wood, Roy Arthur, to International Business Machines Corporation. Programmable latch and other circuits for logic arrays. 3,993,919, Cl. 307-279.000.
Cox, Percy T.: *See*—
Meador, Richard A.; Cox, Percy T.; and Thompson, Larry W., 3,993,944.
Cox, Ray N.; and Parks, Martin A. Road packer. 3,993,413, Cl. 404-128.000.
Cox, Robert N.; and Albers, Kenneth G., to UMC Industries, Inc. Spiral vendor. 3,993,215, Cl. 221-75.000.
Crain, Philip Warren; and Woods, James Frank, to Mattel, Inc. Animated toy. 3,992,806, Cl. 46-116.000.
Cram, Phillip J.; and Redford, David A., to Texaco Exploration Canada Ltd. Thermal recovery of hydrocarbons from tar sands. 3,993,132, Cl. 166-261.000.
Cramm, Russell H.: *See*—
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Credelca A.G.: *See*—
Stucky, Fritz Christoph, 3,992,848.
Crepinsek, Alois, to International Top Security Corporation. Door lock housing assembly and releasable catch. 3,992,908, Cl. 70-370.000.
Creutz, Hans Gerhard; and Capuano, John B., to Oxy Metal Industries Corporation. Zinc electrodeposition process and bath for use therein. 3,993,548, Cl. 204-55.00R.
Crosby, Edward Lewis, Jr., to United States of America, Air Force. Toroidal tail structure for tethered aeroform balloon. 3,993,269, Cl. 244-33.000.
Crounse, Nathan N.; and Desai, Kantilal B., to Sterling Drug Inc. Stilbene optical brighteners and compositions brightened therewith. 3,993,645, Cl. 260-240.00D.
Crounse, Nathan N.; and Ambrosiano, Nicholas A., to Sterling Drug Inc. Thiazolidinylidene-isoindolines. 3,993,658, Cl. 260-306.70R.
Croup, Robert E., to Acoustic Fiber Sound Systems, Inc. Enclosure for automobile trunk-mounted loudspeaker. 3,993,345, Cl. 296-37.160.
Csanyi, Endre: *See*—
Horvath nee Lengyel, Piroska; Institoris, Laszlo; Csanyi, Endre; and Vargha, Laszlo, 3,993,781.
Culioli, Joseph: *See*—
Maubois, Jean-Louis Joseph; Culioli, Joseph; Chopin, Alain; and Chopin, Marie-Christine, 3,993,636.
Cullen, Barry Allen, to W. R. Grace & Co. Process for preparing iminodiacetonitrile. 3,993,681, Cl. 260-465.50A.
Cullen, Carol. Fingernail wrapper and method. 3,993,084, Cl. 132-73.000.
Cullinan Holdings Limited: *See*—
Koekemoer, Gerald John, 3,993,498.
Cummings, Lowell O., to Pacific Vegetable Oil Corporation. Composition for coating wet surfaces or surfaces immersed in water. 3,993,707, Cl. 260-830.0TW.
Cummins Engine Company, Inc.: *See*—
Woollenweber, William E., 3,993,370.
Cunningham, Kelly G. Mining machine having pneumatic conveyance and cutter head floor driven about anchor. 3,993,355, Cl. 299-31.000.
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Curtis, Russell R., to Curtis Dyna Products Corporation. Pulse fog generator. 3,993,582, Cl. 252-359.00A.
Cussell, George A., to Swesco Inc. Endotracheal tube holder. 3,993,081, Cl. 128-351.000.
Cutsogeorge, George Athan, to RCA Corporation. Fast acquisition circuit for a phase locked loop. 3,993,958, Cl. 328-109.000.
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Mitchell, Wallace F., 3,993,060.
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D'Agostino, Salvatore Patrick, to Sheldahl, Inc. Punch assembly for film products with work clamping means. 3,992,966, Cl. 83-175.000.
Dahlman, Goran; and Nilsson, Sten, to Allmanna Svenska Elektriska Aktiebolaget. Press stand. 3,992,837, Cl. 52-223.00R.
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D'Amico, John J., to Monsanto Company. Use of 3-substituted benzothiazolines as plant growth regulants. 3,993,468, Cl. 71-90.000.
Daniele, Joseph John, to North American Philips Corporation. High temperature electrical contact for Peltier-induced liquid phase epitaxy on intermetallic III-V compounds of gallium. 3,993,511, Cl. 148-172.000.
Daniels, Dennis, to U.S. Amada, Ltd. Workpiece-handling apparatus. 3,993,296, Cl. 269-24.000.
Danna, Louis J., to Kreisler Manufacturing Corporation. Adjustable side opening watchband buckle. 3,992,757, Cl. 24-77.00R.
Danray, Inc.: *See*—
Bogda, Michael Vincent; Bousek, Richard J.; Doidge, Frederick G.; and Israel, John W., 3,993,873.
D'Antonio, Nicholas F.; and Bates, Richard L. Diver information system. 3,992,948, Cl. 73-432.00R.
Darmory, Franklin P.; and DiBenedetto, Marianne, to Ciba-Geigy Corporation. Polyimide, polyamide-imide or polyamide-acids with olefin end groups in combination with a reactive Schiff base compound. 3,993,630, Cl. 260-78.0TF.
Davenport, David William, to International Business Machines Corporation. Clock converter circuit. 3,993,957, Cl. 328-38.000.
Davies, Robert William; and Willett, Peter Ernest, to Molins Limited. Cigarette hoppers. 3,993,217, Cl. 221-93.000.
Davila, Octaviano Aguirre; and Hellstrom, Lennart Johan Yngve Johansson, to Telefonaktiebolaget L M Ericsson. Device for wrapping insulation tape about an elongate conductor. 3,993,531, Cl. 156-428.000.
Davis, Edwin Dyer. Scrub sink. 3,992,730, Cl. 4-187.00R.
Davis, John Brian; Skilling, Derek; and Wrigley, Nigel Edwin, to Imperial Chemical Industries Limited. Cooling thermoplastic tubes. 3,993,723, Cl. 264-95.000.
Davis, Mark J.: *See*—
Groves, Harold W.; Davis, Mark J.; and Anderson, D. Richard, 3,993,039.
Davis, William J. Automatic dialing apparatus for telephones. 3,993,876, Cl. 179-90.00B.
Davydov, Boris Leonidovich; Zolin, Vladislav Fedorovich; Koreneva, Lidia Georgievna; and Lavrovsky, Evgeny Anatolievich. Coherent second harmonic generation device. 3,993,915, Cl. 307-88.300.
Day, Guy C. Check writing desk for shopping carts. 3,993,319, Cl. 280-33.99A.
Dayco Corporation: *See*—
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Dead Sea Works Ltd.: *See*—
Epstein, Joseph; Feist, Eli Mosche; and Altaras, Daniel, 3,993,729.
Dean, Americo. Slope grader with longitudinally movable guide frame. 3,992,791, Cl. 37-116.000.
Dean, Norman LeRoy; Embrey, Wallace Eldon; and Marshall, John Thomas, to Dow Chemical Company, The. Preparation of tetrachloropyridine. 3,993,654, Cl. 260-290.0HL.
Debbas, Samir Costandi; Herrman, Arthur John; and Swystun, Alexander Gregory, to Du Pont de Nemours, E. I., and Company. Unbonded fibrous non-woven sheet and articles made therefrom. 3,993,812, Cl. 428-35.000.
De brey, Robert J. Particle flow monitor. 3,993,017, Cl. 116-112.000.
Debus, Henri Robert: *See*—
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Andre, Jacques Maurice Jules Ghislain; Cahen, Raymond Marc; Debus, Henri Robert; Lammers, Rene Odon; and Van Thillo, Hugo Johannes, 3,993,590.
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Van Thillo, Hugo Johannes; Lammers, Rene Odon; Debus, Henri Robert; Cahen, Raymond Marc; and Andre, Jacques Maurice Jules Ghislain, 3,993,592.
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Schulte, Gary Lee, 3,993,157.
Degner, Vernon R., to Envirotech Corporation. Gas ingestion and mixing device. 3,993,563, Cl. 210-221.00M.
Dehner, Anton Hugo. Automatic feeder for composite copying. 3,993,300, Cl. 271-4.000.
Deigner, Paul: *See*—
Stabenow, Joachim; Wunsch, Gerd; Deigner, Paul; Mueller, Franz-Josef; Loeser, Werner; and Steck, Werner, 3,993,807.
Deitch, James C., to Magnetic Controls Company. Patch cord. 3,993,389, Cl. 339-91.00R.
Dekel, Joseph. Watertight nonconductive electronic watchcase including conductive internal plate. 3,992,870, Cl. 58-23.0BA.
Delanair Limited: *See*—
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Del Guercio, Louis R. M.: *See*—
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Demain, Arnold L.; and Nagaoka, Kozo, to Massachusetts Institute of Technology. Derivatives of streptomycin and method of producing streptomycin derivatives by mutational biosynthesis. 3,993,544, Cl. 195-80.00R.
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von Bonin, Wulf; Kleimann, Helmut; de Montigny, Armand; and Ivanyi, Jozsef, 3,993,606.
den Hollander, Willem, to RCA Corporation. Gating circuit for thyristor deflection system. 3,993,931, Cl. 315-408.000.

De Nicola, Frank; and Vallender, G. Edward, to Berryfast, Inc. Method and apparatus for automatically stapling tape. 3,992,768, Cl. 29-429.000.

Dennis, Richard Kay; and Hadden, Edward Leal, to Du Pont de Nemours, E. I., and Company. Connector block. 3,993,384, Cl. 339-17.0CF.

Deno, Norman C.; and Spinelli, Harry J., to Research Corporation. Photochlorination of alkanols. 3,993,550, Cl. 204-158.0HA.

Depping, Karl Dieter: *See—*
Brose, Horst; Depping, Karl Dieter; Hentschel, Dietrich; Kostevc, Bernard; and Schmidt, Klaus, 3,993,798.

Desai, Kantilal B.: *See—*
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des Garets, Christian. Manual pressure sprayer. 3,993,251, Cl. 239-579.000.

Design Interface, Inc.: *See—*
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Design & Process Engineering, Inc.: *See—*
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DeSoto, Inc.: *See—*
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Deubel, Reinhold; Diery, Helmut; Klinner, Wolfgang; List, Karl-Hermann; and Uhrig, Heinz, to Hoechst Aktiengesellschaft. Dispersing and stabilizing agents for dyestuffs. 3,993,439, Cl. 8-34.000.

Devaux, Bernard; and Pacheco, Henri, to Agence Nationale de Valorisation de la Recherche (ANVAR). Process for controlling the growth of dicotyledons. 3,993,470, Cl. 71-94.000.

De Vries, Jochem Jacobus, to U.S. Philips Corporation. Electric shaver with adjustable skin-tightening means. 3,992,775, Cl. 30-34.200.

De Winter, Walter Frans: *See—*
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Dick, John D.; and Wilwerding, Dennis J., to Honeywell Inc. Automatic correct exposure indicator. 3,993,929, Cl. 315-241.00P.

Dickman, Smith V. Tidewater power system. 3,993,913, Cl. 290-53.000.

Dickmanns, Heinz; Keil, Karl-Heinz; and Ribka, Joachim, to Cassella Farbwerke Mainkur Aktiengesellschaft. Process for the dyeing of polyamide fibers with sulphur dyestuffs. 3,993,437, Cl. 8-21.00B.

Dickson, Robert E.; and Barkin, Stanley M., to Colgate-Palmolive Company. Soil-release finish. 3,993,830, Cl. 428-290.000.

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Deubel, Reinhold; Diery, Helmut; Klinner, Wolfgang; List, Karl-Hermann; and Uhrig, Heinz, 3,993,439.

Diesner, Ferdinand, to Patax Trust Reg. Method of and a machine for manufacturing nap fabric strip closure devices. 3,993,105, Cl. 139-291.00C.

Dietzel, Walter; Matusch, Siegfried; and Hentschel, Volkmar, to Braunschweigische Maschinenbauanstalt. Centrifuge drum and method of making such centrifuge drum. 3,993,243, Cl. 233-2.000.

DiFazio, Joseph, to Acorn Building Components, Inc. Glazing adaptor. 3,992,843, Cl. 52-398.000.

Digby, Peter Raymond: *See—*
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Diggs, William F. Solar energized steam generator system. 3,993,041, Cl. 126-271.000.

Dijet Industrial Co., Ltd.: *See—*
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Dikoff, Joseph K. Forward releasing snow ski boot. 3,992,789, Cl. 36-117.000.

Display Originals, Inc.: *See—*
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Donohue, Paul C. Pin cylinder litter collector. 3,993,141, Cl. 171-63.000.

Dorgnon, Roger. System for introducing and placing caseless pellets in a firing apparatus. 3,992,796, Cl. 42-90.000.

Dorner, Karl-Heinz: *See—*
Bauer, Heinrich; Dorner, Karl-Heinz; Eberlin, Helmut; Kaulen, Hans; Pazurek, Werner; Richarz, Heinz; Taubmann, Harro J.; and Wolf, Gerhard, 3,993,201.

Doss, Richard C.; and Jurrens, Lawrence D., to Phillips Petroleum Company. Adhesive composition. 3,993,613, Cl. 260-27.00R.

Double E Company, Inc.: *See—*
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Douek, Maurice; Schmidt, Gustav A.; Malofsky, Bernard M.; and Hauser, Martin, to Avery Products Corporation; and Loctite Corporation. Anaerobic pressure sensitive adhesive stocks. 3,993,815, Cl. 428-40.000.

Dow Badische Company: *See—*
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Draftex Development A.G.: *See—*
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Drane, Terry Lee, to Koppers Company, Inc. Floating asphalt pavement system. 3,993,412, Cl. 404-28.000.

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Dresser Industries, Inc.: *See—*
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Drews, Klaus; and Krumme, Jens-Peter, to U.S. Philips Corporation. Substrate holder for etching thin films. 3,993,909, Cl. 250-492.00A.

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Droppleman, David Andrew: *See—*
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Duel, Don Myrton; and Maiershofer, Helmut Carl, to Motorola, Inc. Suspension system for underwater equipment. 3,992,737, Cl. 9-8.00R.

Duell, Richard J.; and Ferrel, John A., to Carrier Corporation. Movable expansion valve. 3,992,898, Cl. 62-324.000.

Duffner, Morris V.; and Mintz, Alexander, to Grumman Aerospace Corporation. Magnetic forming process for joining electrical connectors and cables. 3,992,773, Cl. 29-628.000.

Dukert, Andrew A.; and Christofas, Alkis, to Pennwalt Corporation. Plastic laminate construction. 3,993,827, Cl. 428-251.000.

Dumont, Claude; and Laurent, Jacques, to Roussel-UCLAF. Treatment of depressive states and Parkinson's disease. 3,993,764, Cl. 424-267.000.

Dunbar, Gordon: *See—*
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Dunlap, Norman D.; and Rickert, Glenn E., to Precision Tool & Machine Co., by said Dunlap. Recoil resistant mounting system. 3,992,783, Cl. 33-250.000.

Dunlop Limited: *See—*
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Dunn, Richard G.; Sidebotham, Melvin H., Jr.; and Sidebotham, Gordon L., to Real-Reel Corporation, The. Apparatus for forming diagonally corrugated paperboard. 3,993,425, Cl. 425-370.000.

Dunnavant, William R.; Harris, Edward M.; Kurz, Philip F.; Markle, Richard A.; and Parker, Edward H., to Western Litho Plate & Supply Co. Monomeric compounds. 3,993,684, Cl. 260-471.00R.

Dunnenberger, Max; and Schellenbaum, Max, to Ciba-Geigy AG. Method for combating harmful microorganisms using 2-hydroxybenzophenone derivatives. 3,993,779, Cl. 424-331.000.

Du Pont de Nemours, E. I., and Company: *See—*
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Dwyer, James F. Device for imprinting indicia on a flexible article. 3,992,988, Cl. 101-9.000.

Dynamit Nobel Aktiengesellschaft: *See—*
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Ebner, Theran L.; and Hawkins, Donald W., to Houston Natural Gas Corporation. Tone receiver. 3,993,875, Cl. 179-84.0VF.

Ecker, Frank Allen: *See—*
Hubbard, Glenn Richard; Jacoby, Harold John; Ecker, Frank Allen; Haffner, Donald Gene; and Saiia, Anthony Joseph, 3,992,858.

Eckert, Konrad: *See—*
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Economy, James; and Lei, George Y., to Carborundum Company, The. Anionic dyeing of novoloid fibers. 3,993,442, Cl. 8-173.000.

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Chiari, Natale; Calabria, Valerio; and Inverardi, Giuseppe, 3,992,866.

Edmondson, Bill E. Rate-of-ascent monitoring instrument for divers. 3,992,949, Cl. 73-432.00R.

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Beard, Colin C.; Edwards, John A.; and Fried, John H., 3,993,769.

Edwards, John W., to Ginny Bee Harvester Corporation. Crop harvesting apparatus. 3,992,861, Cl. 56-328.00R.

Efimov, Viktor Mikhailovich: *See—*
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Eichenbaum, Daniel M.: *See—*
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Eiermann, Dankwart; and Wankel, Felix, to Wankel GmbH. Method of operating a compound supercharged rotary piston engine. 3,993,029, Cl. 123-8.070.

Eigenbrode, George Thomas, to Du Pont de Nemours, E. I., and Company. Headers with insertable latch members. 3,993,390, Cl. 339-91.00R.

Eigenbrode, George Thomas, to Du Pont de Nemours, E. I., and Company. Connector block. 3,993,396, Cl. 339-220.00R.

Eisenbau Wyhlen AG: *See—*
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Elektrogeno AS: *See—*
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Elkins, Luther. Portable toilet. 3,992,727, Cl. 4-10.000.

Eller, Robert: *See—*
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Elliott Brothers (London) Limited: *See—*
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Ells, John William; and Roberts, Arthur, to British Petroleum Company Limited, The. Underwater pipelines. 3,992,924, Cl. 73-40.50A.

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Emtage, Peter R.: *See—*
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Encinas, Jean, to U.S. Philips Corporation. Method of manufacturing an integrated circuit utilizing outdiffusion and multiple layer epitaxy. 3,993,512, Cl. 148-175.000.

Enei, Hitoshi: *See—*
Uchio, Ryosuke; Kikuchi, Kenji; Enei, Hitoshi; and Hirose, Yoshio, 3,993,543.

Energy Development Associates: *See—*
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Engelhard Minerals & Chemicals Corporation: *See—*
Hindin, Saul G.; and Dettling, Joseph C., 3,993,572.
Isaac, Peter A. H.; and Oulton, T. Dixon, 3,993,500.

English, Paul Nelson. Underwater radiographic apparatus. 3,993,906, Cl. 250-321.000.

Envirotech Corporation: *See—*
Degner, Vernon R., 3,993,563.

Epstein, Joscph; Feist, Eli Mosche; and Altaras, Daniel, to Dead Sea Works Ltd. Process for the manufacture of potassium phosphates. 3,993,729, Cl. 423-184.000.

Epstein, Sheldon L., to Coulter Electronics, Inc. Particle analyzer having scanning apparatus series coupled between a d.c. power source and the parallel connection of a d.c. short-circuiting device and a voltage sensitive signal detector. 3,993,948, Cl. 324-71.0CP.

Erb, Elisha W.; and Resch, Darrel R. Nebulizer and method. 3,993,246, Cl. 239-8.000.

Erlichman, Irving, to Polaroid Corporation. Method for manufacturing flat batteries. 3,993,508, Cl. 29-623.200.

Ernst, Dieter: *See—*
Tummes, Hans; Cornils, Boy; Meis, Josef; Ernst, Dieter; and Tomuschat, Hans-Joachim, 3,993,695.

Errico, Giacomo J. Tennis ball caddy. 3,993,307, Cl. 273-73.00R.

Erspamer, James R.; and McCombs, Howard R., to Sperry Rand Corporation. Compensated toroidal accelerometer. 3,992,951, Cl. 73-497.000.

Escales, Eberhard: *See—*
Hell, August; Weber, Klaus; and Escales, Eberhard, 3,992,965.

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Esco Corporation: *See—*
Oettinger, John F., 3,993,227.

Esmay, Donald L., to Minnesota Mining and Manufacturing Company. Polyurethane foam-backed pressure-sensitive adhesive tape. 3,993,833, Cl. 428-311.000.

Etchells, John L.: *See—*
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Ethyl Corporation: *See—*
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La Borde, Joseph N., 3,992,839.

Eue, Ludwig: *See—*
Regel, Erik; Eue, Ludwig; and Schmidt, Robert R., 3,993,469.

Evans, John L.; and Boerner, Donald R., to Singer Company, The. Two axis caging system. 3,992,955, Cl. 74-5.100.

Everest & Jennings, Inc.: *See—*
Rodaway, Keith Samuel, 3,993,351.

Exel, Heribert G. Stackable cardboard box, in particular for fruit and similar products. 3,993,239, Cl. 229-23.00R.

Exner, Gerhard: *See—*
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Exxon Research and Engineering Company: *See—*
Arey, William F., Jr.; Hamner, Glen P.; and Sawyer, Willard H., 3,993,598.
Cahn, Robert P.; Longwell, John P.; and Wythe, Stephen L., 3,993,457.
Long, Fred M.; and Sawyer, Willard H., 3,993,601.
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van Brederode, Robert A.; and Floyd, Joseph C., 3,993,713.

F. J. Littell Machine Company: *See—*
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Fabian, Wolfgang; Klein, Konrad; Sevenich, Theodor; and Wladika, Hans, to Hoesch Werke Aktiengesellschaft. Intake device for a band rolling mill. 3,992,916, Cl. 72-251.000.

Fabian, Wolfgang: *See—*
Nellen, Wilhelm; Fabian, Wolfgang; and Sevenich, Theodor, 3,993,086.

Fairbanks, David William, to RCA Corporation. Overhead signal pickup device. 3,993,316, Cl. 274-23.00A.

Fairchild Camera and Instrument Corporation: *See—*
O'Brien, David, 3,993,513.

Fantuz, Carlo: *See—*
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Farha, Floyd E., Jr.: *See—*
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Farkas, Robert D. Apparatus for treating plastic loads. 3,993,529, Cl. 156-380.000.

Farmer, John Edgar, to Farmer Mold and Machine Works, Inc. Battery grid plate mold and method. 3,992,759, Cl. 29-2.000.

Farmer Mold and Machine Works, Inc.: *See—*
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Farr, David Robert: *See—*
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Farrar, Jack R.: *See—*
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Fassler, Friedbert. Liquid actuated reciprocating shower brush. 3,992,744, Cl. 15-22.00R.

Faubel, Rolf; and Holler, Gerd, to E. Siepmann & Co. Installation for polishing pieces of cutlery. 3,992,822, Cl. 51-237.00T.

Federal-Mogul Corporation: *See—*
Haynie, Robert Nelson; and Pathak, Ramjee, 3,992,763.

Feess, Erich: *See—*
Birke, Walter; Feess, Erich; von der Eltz, Hans-Ulrich; Roth, Kurt; and Schon, Franz, 3,993,434.

Feist, Eli Mosche: *See—*
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Feldstein, Nathan, to Surface Technology, Inc. Electroless plating. 3,993,491, Cl. 106-1.000.

Feldstein, Nathan, to Surface Technology, Inc. Electroless plating process employing non-noble metal hydrous oxide catalyst. 3,993,799, Cl. 427-53.000.

Feldstein, Nathan, to Surface Technology, Inc. Catalytic developer. 3,993,801, Cl. 427-98.000.

Feldstein, Nathan, to Surface Technology, Inc. Catalytic primer. 3,993,848, Cl. 428-457.000.

Fellman, Daniel J., to Calspan Corporation. Scanning line filter. 3,993,888, Cl. 235-151.000.

Felten & Guilleaume Carlswerk AG: *See—*
Fuhrmann, Bruno, 3,993,937.

Fernandez, Heriberto; and Pardue, George T. Seizure suppression device. 3,993,046, Cl. 128-2.10B.

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Ferrox AB: *See—*
Laurila, Jaakko Johanes, 3,992,745.
Ferwerda, Thomas Norvin. Stairway safety suspension support means. 3,992,832, Cl. 52-184.000.
Fetisenko, Nikolai Pavlovich: *See—*
Chepelev, Viktor Gavrilovich; Grinchenko, Nikolai Nikolaevich; Goldshtein, Jury Moiseevich; Shvarts, David Leonidovich; Fetisenko, Nikolai Pavlovich; and Grinchenko, Vladimir Nikolaevich, 3,993,127.
Feucht, Donald L.: *See—*
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Fewkes, Graham H., to Draftex Development A.G. Channel-shaped sealing, finishing and guide strips and methods of making them. 3,993,819, Cl. 428-136.000.
Fiat-Allis Construction Machinery, Inc.: *See—*
Beveridge, Paul J., 3,993,175.
Fichtel & Sachs A.G.: *See—*
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Fiebig, August Emil, Jr.: *See—*
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Cella, John A.; Lukey, Robert A.; Fiebig, August Emil, Jr.; and Pum, Frank J., 3,993,745.
Field, Donald G., to Youngs Rubber Corporation. Apparatus for processing elastic articles. 3,992,766, Cl. 29-235.000.
Filby, Evan E., to United States of America, Energy Research and Development Administration. Method of recycling lithium borate to lithium borohydride through diborane. 3,993,732, Cl. 423-286.000.
Findeli, Bernard, to Robert Bosch G.m.b.H. Power tool. 3,993,145, Cl. 173-12.000.
Fine Organics Inc.: *See—*
Howanitz, Joseph; and Greenberg, Irwin, 3,993,575.
Finlay, Walter L.: *See—*
Hay, Donald A.; Gregg, Peter T.; and Finlay, Walter L., 3,993,478.
Finney, David John, to Thomas J. Lipton, Inc. Soft ice cream. 3,993,793, Cl. 426-565.000.
Finot, Paul-Andre: *See—*
Mauron, Jean; Finot, Paul-Andre; and Mottu, Francoise, 3,993,795.
Firestone Tire & Rubber Company, The: *See—*
Halasa, Adel Farhan, 3,993,856.
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Firmenich & Cie: *See—*
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Firmenich S.A.: *See—*
Thomas, Alan Francis; and Ohloff, Gunther, 3,993,604.
Fischer, Artur. Multi-gear transmission for toys. 3,992,956, Cl. 74-29.000.
Fischman, Martin; and L'Hommedieu, Jesse H., to GTE Sylvania Incorporated. Vertical deflection system. 3,993,930, Cl. 315-397.000.
Fischthal, Marvin P.: *See—*
Greenberg, Samuel J.; Fischthal, Marvin P.; Blond, Elliot E.; and Schaefer, Roger A., 3,992,786.
Fisher, John G.: *See—*
Straley, James M.; and Fisher, John G., 3,993,637.
Fisher, Walter A., to Griswold Machine & Engineering, Inc. Trench shoring assembly with force transferring accessory. 3,992,887, Cl. 61-41.00A.
Fishwick, Brian Ribbons; Boyd, Violet; and Glover, Brian, to Imperial Chemical Industries Limited. Process for coloring aromatic polyester-cellulose unions with a reactive dyestuff and a disperse dyestuff containing at least two carboxylic acid ester groups. 3,993,438, Cl. 8-21.00C.
Fiske, Charles C. Check locator. 3,993,329, Cl. 282-29.00B.
Fives-Cail Babcock: *See—*
Pacault, Pierre Henri, 3,992,884.
Flagg, Richard Edward, to Double E Company, Inc. Core chuck. 3,993,317, Cl. 279-2.00R.
Flament, Ivon: *See—*
Winter, Max; Gautschi, Fritz; Flament, Ivon; Stoll, Max; and Goldman, Irving M., 3,993,792.
Fleckenstein, Lee J., to Eastman Kodak Company. Ballasted p-sulfonamidophenols capable of releasing a non-heterocyclic azo dye. 3,993,638, Cl. 260-197.000.
Fleckenstein, Robert C.; and Kamdar, Kirit S. Sanitary conveyor. 3,993,185, Cl. 198-813.000.
Flegel, George J.: *See—*
Polster, Lewis H.; and Flegel, George J., 3,993,102.
Florence, David M., to Armstrong Cork Company. Smoke-suppressant and fire-retardant poly(vinyl chloride) compositions. 3,993,607, Cl. 260-2.5FP.
Floyd, Joseph C.: *See—*
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Flynn, Stephen Donald. Positive pressure resuscitator. 3,993,095, Cl. 137-596.100.
FMC Corporation: *See—*
Stock, David K., 3,992,981.
Fogarty, Thomas J. Vessel occluding instrument. 3,993,076, Cl. 128-325.000.
Fogelberg, Mark J., to Borg-Warner Corporation. Automatic four-wheel drive transfer case. 3,993,152, Cl. 180-44.00R.
Foley, Kevin M.; and Vigo, Francesco M., to Owens-Corning Fiberglas Corporation. Complex organo silicon compounds. 3,993,837, Cl. 428-391.000.
Forberg, Hans-Jurgen, to Transcodan Sven Husted-Andersen. Piercing cannula of infusion and transfusion instruments. 3,993,068, Cl. 128-214.00C.
Ford, James A.; and Bell, David E., to Kirsch Company. Hinged slide gate. 3,992,750, Cl. 16-95.00D.
Ford Motor Company: *See—*
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Moorman, James W., 3,992,878.
Rhodes, Eugene E., 3,993,125.
Forker, Richard O., to Raymond Lee Organization, Inc., The, a part interest. Liquid fuel fireplace log. 3,993,430, Cl. 431-125.000.
Formflo Limited: *See—*
Connell, Gordon Sidney; and Andriessen, Ronald Carl, 3,992,910.
Connell, Gordon Sidney; and Andriessen, Ronald Carl, 3,992,911.
Connell, Gordon Sidney, 3,992,914.
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Forster, Hans-Joachim M., to Daimler-Benz Aktiengesellschaft. Drive arrangement for the auxiliary aggregates of a motor vehicle. 3,992,885, Cl. 60-698.000.
Forster, Karl-Heinz: *See—*
Riedl, Rudi; J ungnickel, Regina; Nitsch, Rainer; Lein, Werner; Vetter, Lothar; Schone, Helmut; Weisbach, Gunter; Johne, Hans; Schott, Alfred; Forster, Karl-Heinz; and Johne, Albrecht, 3,993,303.
Fortsch, William A., to Thomas & Betts Corporation. Strap tightening and severing tool. 3,993,109, Cl. 140-123.600.
Foster, Edwin E.; and Foster, Thomas E. Spring sash counterbalance. 3,992,751, Cl. 16-197.000.
Foster Grant Co., Inc.: *See—*
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Fox, Charles L., Jr., to Research Corporation. Aqueous hypertonic solution and compositions useful for preparation of same. 3,993,750, Cl. 424-128.000.
Fradin, Maurice: *See—*
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Fraleigh, Robert James: *See—*
Back, Paul Roger; Fraleigh, Robert James; and Albano, Rocco Vincent, 3,992,930.
Fram, Morris, to Ransburg Corporation. Fiber cutter. 3,992,967, Cl. 83-347.000.
France Bed Co., Ltd.: *See—*
Yokota, Masayuki, 3,993,106.
Francis, Howard T., to Biomedical International Company. Biomedical electrode. 3,993,048, Cl. 128-2.06E.
Franz, John E., to Monsanto Company. Hydroxyalkyl esters of N-phosphonomethyl glycine and the herbicidal use thereof. 3,993,467, Cl. 71-86.000.
Franz Plasser Bahnbaumaschinen-Industrie-Gesellschaft m.b.H.: *See—*
Schubert, Egon, 3,992,935.
Franzosi, Alerto Lorenzo: *See—*
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Franzosi, Jose Francisco: *See—*
Franzosi, Mario Carlos, 3,993,219.
Franzosi, Mario Carlos, to Franzosi, Jose Francisco; and Franzosi, Alerto Lorenzo, part interest to each. Metering and mixing apparatus for a plurality of liquids. 3,993,219, Cl. 222-56.000.
Fredrick, William G., Jr., to Photon Sources, Inc. Apparatus for directing a laser beam. 3,993,402, Cl. 350-285.000.
Freedman, Jules, to Richardson-Merrell Inc. Method of treating inflammation with morphanthridines. 3,993,757, Cl. 424-244.000.
Freeman, Michael Alexander Reykers; and Tuke, Michael Anthony, to National Research Development Corporation. Endoprosthetic bone joint devices. 3,992,726, Cl. 3-1.910.
Freshel, David C. Tree treating system. 3,992,813, Cl. 47-57.500.
Fridman, Rune Evert; and Johansson, Hans Gosta, to Stifab AB. Pipe jointing piece with O-rings. 3,993,334, Cl. 285-344.000.
Fried, John H.: *See—*
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Beard, Colin C.; Edwards, John A.; and Fried, John H., 3,993,769.
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Ljung, Bo H.; and Friedland, Bernard, 3,992,953.
Frost, Genevieve O. Guard to prevent opening of sliding doors. 3,993,336, Cl. 292-263.000.
Frye, Jule B., to Raymond Lee Organization, Inc., The, a part interest. Snow shoe harness. 3,992,790, Cl. 36-125.000.
Fuhr, Leo. Hosiery donning apparatus. 3,993,228, Cl. 223-111.000.
Fuhrmann, Bruno, to Felten & Guilleaume Carlswerk AG. Circuit for increasing the impedance of a winding wound around two cores made of soft magnetic material. 3,993,937, Cl. 317-123.000.
Fuji Photo Film Co., Ltd.: *See—*
Hasunuma, Kenzo; Watanabe, Hideomi; and Tsuji, Nobuo, 3,993,629.
Ichii, Hirokazu, 3,994,006.
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Fujinuma, oshimori, to Shiseido Co., Ltd. Dyeing live hair with melanin precursors. 3,993,436, Cl. 8-10.200.
Fujisawa Pharmaceutical Co., Ltd.: *See—*
Kamiya, Takashi; Saito, Yoshihisa; Teraji, Tsutomu; Nakaguti, Osamu; Oku, Teruo; Nakamura, Hitoshi; and Hashimoto, Masashi, 3,993,646.
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Brook, Greville Bertram; and Bowyer, William Henry, 3,993,238.
Funck, Herbert, to Dr. Ing. Funck K.G. Gluing press for shoes or other similarly shaped workpieces. 3,992,742, Cl. 12-1.00F.
Futamase, Tsuyoshi: *See—*
Chibana, Masanobu; and Futamase, Tsuyoshi, 3,992,970.
Chibana, Masanobu; and Futamase, Tsuyoshi, 3,992,971.
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FXC Corporation: *See—*
Chevrier, Francois X.; and Jones, Leon, 3,992,999.
Gabbert, James D.: *See—*
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Gaffar, Abdul; and Marcussen, Hans Wilhelm, Jr., to Colgate-Palmolive Company. Method for local immunization against dental caries. 3,993,747, Cl. 424-88.000.
Gainesville Machine Company, Inc.: *See—*
Harben, Grover S., Jr.; and Graham, Kenneth Z., 3,992,752.
Gallacher, Bernard G., to Southern Pacific Transportation Company. Slippery wheel detector. 3,993,270, Cl. 246-182.00A.
Gallagher, Evan Patrick. Prosthetic guitar pick. 3,992,975, Cl. 84-322.000.
Galliath, Andre Paul; and Weis, Valentine Eugene, to Interpace Corporation. Porous ceramic articles and method for making same. 3,993,495, Cl. 106-40.00R.
Galusky, Thom B., to SCM Corporation. Continuous production of hydrated lipids. 3,993,580, Cl. 252-311.000.
Gambro AG: *See—*
Bergentz, Sven Erik; and Strid, Kurt Sven Theodore, 3,993,078.
Garbalizer Corporation of America: *See—*
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Gardiner, Frances R.: *See—*
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Garland, Eddie Clark, to Brown & Root, Inc. Method and apparatus for retrieving, securing, and launching an anchor buoy. 3,993,011, Cl. 114-43.5VC.
Garrett Corporation, The: *See—*
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Tippetts, Thomas B.; and Chapin, Donald W., 3,993,101.
Gasser, Rupert Josef; and Watercutter, Steven N., to Societe d'Assistance Technique pour Produits Nestle S.A. Preparation of tea extracts. 3,992,983, Cl. 99-287.000.
Gaston County Dyeing Machine Company: *See—*
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Gates, Walter C., Jr.: *See—*
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Gatts, James D. Infant environmental transition system. 3,993,042, Cl. 128-1.00B.
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Gehrke, Gerard William, to Torrington Company, The. Overrunning clutch and retainer and roller assembly therefor. 3,993,177, Cl. 192-45.000.
General Binding Corporation: *See—*
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Burke, Hubert K.; and Michon, Gerald J., 3,993,897.
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Warmoth, Denis; and Porter, Kenneth James, 3,993,945.
Gerontopoulos, Panayotis; and Fantuz, Carlo, to AGIP NUCLEARE, S.p.A. Process for controlling the geometrical properties of particles of ceramic materials. 3,993,578, Cl. 252-301.10R.
Gerry, Martin E. Double energy inductive-capacitive discharge ignition system. 3,993,035, Cl. 123-148.00E.
Gertsch AG: *See—*
Kaineder, Herbert; and Svoboda, Dipl.-Ing. Josef, 3,993,327.
Geske, Marvin L., to Honeywell Inc. Hall effect elements. 3,994,010, Cl. 357-27.000.
Getchell, F. Grant. Drapery slide and adjustable clip combination. 3,992,749, Cl. 16-93.00D.
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Giacomelli, Peter; and Olsson, Alvar, to Sobrefina SA. Arrangement for capping machines. 3,992,857, Cl. 53-306.000.
Giggins, Charles Stanley, Jr.; and Kear, Bernard Henry, to United Technologies Corporation. Alumina forming coatings containing hafnium for high temperature applications. 3,993,454, Cl. 29-194.000.
Gijzen, Wilhelmus Adrianus Henricus: *See—*
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Gilbert, Donald Edmond, to Powell Electrical Manufacturing Company. Two wire command and monitoring system. 3,993,977, Cl. 340-147.0LP.
Gilmore, Merle Lee; Steel, Francis Robert; and Tempka, John Anthony, to Motorola, Inc. Digital detection system for differential phase shift keyed signals. 3,993,956, Cl. 325-320.000.
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Ginaven, Marvin E., to Bauer Bros. Co., The. Bar or wire-like elements for use in classifying and screening apparatus. 3,993,567, Cl. 210-498.000.
Ginny Bee Harvester Corporation: *See—*
Edwards, John W., 3,992,861.
Ginsburg, Arthur P., to United States of America, Air Force. Method and apparatus for pattern analysis. 3,993,976, Cl. 340-146.30P.
Giolito, Silvio L.; and Hofmann, Harry O., to Stauffer Chemical Company. Methane sulfonyl chloride and process of preparation. 3,993,692, Cl. 260-543.00R.
Gleizes, Raymond, to Maison Murat. Apparatus for the mounting and shaping of contacts on telephonic relay elements. 3,992,762, Cl. 29-33.00M.
Globe Universal Sciences, Inc.: *See—*
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Goggins, William B., to United States of America, Air Force. Adaptive clutter cancellation for synthetic aperture AMTI radar. 3,993,994, Cl. 343-5.0CM.
Goldberg, Bruce S.; and Loft, John T., to Amerace Corporation. Reverse osmosis apparatus. 3,993,566, Cl. 210-433.00M.
Goldman, Irving M.: *See—*
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Goldman, Scott D.: *See—*
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Chepelev, Viktor Gavrilovich; Grinchenko, Nikolai Nikolaevich; Goldshtein, Jury Moiseevich; Shvarts, David Leonidovich; Fetisenko, Nikolai Pavlovich; and Grinchenko, Vladimir Nikolaevich, 3,993,127.
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Gooch, Jan W.; and Wrape, Aloysius J., to Chlortrol Inc. Dust control system. 3,993,460, Cl. 55-92.000.
Goodyear Aerospace Corporation: *See—*
Rauckhorst, Bernard C.; and Pfeiffer, Harry O., 3,993,926.
Goransson, Bengt Sigvard. Conduits for electrical conductors. 3,993,330, Cl. 285-14.000.
Gordos Corporation, The: *See—*
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Grace, Michael H.: *See—*
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Graentzel, Alfred. Photochemical reactor. 3,993,911, Cl. 250-527.000.

Graf, Manfred, to J. Hengstler K.G. Data reader. 3,993,893, Cl. 235-61.11E.

Graham, Kenneth Z.: *See—*
Harben, Grover S., Jr.; and Graham, Kenneth Z., 3,992,752.

Granger, Charles C. Combustion gas pressure generator. 3,992,877, Cl. 60-39.680.

Granges Essem Aktiebolag: *See—*
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Grasselli, Robert K.; Miller, Arthur F.; and Shaw, Wilfrid G., to Standard Oil Company (Ohio), The. Ammoxidation using chromium-containing catalysts. 3,993,680, Cl. 260-465.300.

Grasshoff, J. Michael; and Taylor, Lloyd D., to Polaroid Corporation. Quinone methide photographpic reagent precursors. 3,993,661, Cl. 260-308.00D.

Gratton, Brian: *See—*
Butler, Geoffrey Langford; and Gratton, Brian, 3,993,826.

Gravett, Darrell E. Trailer coupling apparatus. 3,993,325, Cl. 280-415.00B.

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Green Cross Corporation, The: *See—*
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Greenberg, Charles B.; and Harmon, Peter P., to PPG Industries, Inc. Thin films containing metallic copper and silver by replacement without subsequent accelerated oxidation. 3,993,845, Cl. 428-433.000.

Greenberg, Irwin: *See—*
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Greenberg, Samuel J.; Fischthal, Marvin P.; Blond, Elliot E.; and Schaefer, Roger A., to Grumman Aerospace Corporation. Apparatus for sequence training. 3,992,786, Cl. 35-9.00R.

Greene, Aubrey E.; and Layfield, Thomas F. Tire truing machine. 3,993,115, Cl. 157-13.000.

Greene, Aubrey E.; and Anderson, James D. Low profile air jack. 3,993,286, Cl. 254-8.00B.

Greene, Clarence Kirk. Apparatus for safety braking of vehicles. 3,993,360, Cl. 303-3.000.

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Grendelman, Jennigje: *See—*
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Gretter, Joseph Clemens. Building panel. 3,992,844, Cl. 52-426.000.

Grieco, Gaetano C. R.; Grieco, Joseph P. O.; and Grieco, Hugo R. A. Light transmitting window panes. 3,993,813, Cl. 428-38.000.

Grieco, Hugo R. A.: *See—*
Grieco, Gaetano C. R.; Grieco, Joseph P. O.; and Grieco, Hugo R. A., 3,993,813.

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Grier, William R.: *See—*
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Griffin, Earl Harris, to RCA Corporation. Digital-to-synchro converter. 3,993,993, Cl. 340-347.0SY.

Griffith, James R.; and O'Rear, Jacques G., to United States of America, Navy. Polyphthalocyanines prepared from N,N-bis(3,4-dicyanophenyl) alkanediamides. 3,993,631, Cl. 260-78.0TF.

Grimbly, James Leonard Charles: *See—*
Arnold, John Spencer; and Grimbly, James Leonard Charles, 3,993,874.

Grinchenko, Nikolai Nikolaevich: *See—*
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Chepelev, Viktor Gavrilovich; Grinchenko, Nikolai Nikolaevich; Goldshtein, Jury Moiseevich; Shvarts, David Leonidovich; Fetisenko, Nikolai Pavlovich; and Grinchenko, Vladimir Nikolaevich, 3,993,127.

Griswold Machine & Engineering, Inc.: *See—*
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Groff, Eugene R.; and Wright, Paul L., to Caterpillar Tractor Co. Track carrying wheels for crawler type vehicles having improved panel assemblies. 3,993,356, Cl. 301-6.0WB.

Gross, Franz, to Siemens Aktiengesellschaft. Vacuum-tight window arrangement for rectangular waveguides. 3,993,969, Cl. 333-98.00P.

Gross, James Richard, to Dow Chemical Company, The. Alkali metal carboxylic polyelectrolyte solutions with N-methylol crosslinker. 3,993,616, Cl. 260-29.4UA.

Grossan, Murray. Pulsating massage system. 3,993,053, Cl. 128-64.000.

Groth, Hugh F.: *See—*
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Groves, Harold W.; Davis, Mark J.; and Anderson, D. Richard, to Sandia Sports, Inc. Compound archer bow. 3,993,039, Cl. 124-23.00R.

Grumman Aerospace Corporation: *See—*
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Grunberg, Emanuel; and Hoffer, Max, to Hoffmann-La Roche Inc. Antibacterial compositions. 3,993,761, Cl. 424-251.000.

Gruppo Lepetit S.p.A.: *See—*
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Grzesiek, Louis E.; and Juntunen, William H., to Abitibi Corporation. Wall siding fasteners and assemblies. 3,992,845, Cl. 52-547.000.

GTE Automatic Electric Laboratories Incorporated: *See—*
Lee, Man Shek, 3,993,968.
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Cosco, Robert J.; Pappas, John A.; and Hebert, Roger T., 3,993,922.
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Kiger, William T.; Kamin, George J., deceased; and Kamin, Shirley A., administratrix, 3,993,844.

Gubelmann, Walter S., executor: *See—*
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Gubelmann, William S., deceased; by Gubelmann, Walter S., executor; and Grier, William R., to Realty & Industrial Corporation. Justifying, text writing composing machine. 3,993,179, Cl. 197-19.000.

Guenthner, Richard A., to Minnesota Mining and Manufacturing Company. Noxious vapor suppression using glass microbubbles with a fluorosilane or polyfluorosiloxane film. 3,993,443, Cl. 21-60.50A.

Guilbault, Lawrence James, to Calgon Corporation. Water-soluble vinyl-pyrrolidone block copolymers. 3,993,712, Cl. 260-875.000.

Gulf Research & Development Company: *See—*
Onopchenko, Anatoli; and Schulz, Johann G. D., 3,993,676.

Gulf & Western Industries, Inc.: *See—*
Baermann, Max, 3,993,895.

Guliani, Surinder Singh; Petit, John David; and Sawdy, John Francis, to Babcock & Wilcox Limited. Press brake performance tester. 3,993,898, Cl. 250-215.000.

Gumm, Peter; Krussig, Karl-Heinz; Lohmann, Jorg; and Zimmermann, Josef, to Hoechst Aktiengesellschaft. Apparatus for fastening a corrugated sheet to a flat sheet. 3,993,428, Cl. 425-521.000.

Gunson's Sortex Limited: *See—*
Chapman, Thomas Henry, 3,993,899.

Gupta, Omkarath R.: *See—*
Antonetti, Vincent W.; Arent, Gordon R.; and Gupta, Omkarath R., 3,992,894.

Gupta, Omkarnath R.: *See—*
Chu, Richard C.; Gupta, Omkarnath R.; Hwang, Un-Pah; and Simons, Robert E., 3,993,123.

Guresh, Stephen G.; and Boyer, James Heilig, Jr., to Rockwell International Corporation. Support device for cylinder of a circular knitting machine. 3,992,902, Cl. 66-8.000.

Gustafsson, Sven Gustaf, to Telefonaktiebolaget L M Ericsson. Method of diffusing gas into a sealed vessel and a device for carrying out the method. 3,993,110, Cl. 141-4.000.

Guthrie, Robert William; and Kierstead, Richard Wightman, to Hoffmann-La Roche Inc. Hydroxycitric acid derivatives. 3,993,667, Cl. 260-343.600.

Guthrie, Robert William; and Kierstead, Richard Wightman, to Hoffmann-La Roche Inc. Hydroxycitric acid derivatives. 3,993,668, Cl. 260-343.600.

Gutshall, Charles E. Tilting terminal clamp assembly. 3,993,397, Cl. 339-246.000.

Guy, Cathy; and Hicks, Judy. Oil painting coin bank. 3,993,242, Cl. 232-4.00R.

Haage, Karl; and Scharff, Dieter, to Dynamit Nobel Aktiengesellschaft. Roof construction of a plurality of thermoplastic composite sheets with inorganic flameproofing layer. 3,992,842, Cl. 52-309.000.

Haarmann, Walter: *See—*
Nickl, Josef; Muller, Erich; Narr, Berthold; Haarmann, Walter; Schroter, Wolfgang; and Kadatz, Rudolf, 3,993,683.

Haas, Norman C.; and Christiansen, Keith W., to Chicago Rawhide Manufacturing Company. Retainer assembly for mold plate. 3,993,420, Cl. 425-127.000.

Hadden, Edward Leal: *See—*
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Haffner, Donald Gene: *See—*
Hubbard, Glenn Richard; Jacoby, Harold John; Ecker, Frank Allen; Haffner, Donald Gene; and Saiia, Anthony Joseph, 3,992,858.

Hagedorn, Ferdinand; Wedemeyer, Karlfried; and Mayer-Mader, Rodulf, to Bayer Aktiengesellschaft. Water-soluble complex of cuprous chloride, hydrochloric acid and at least one amine or amine salt. 3,993,586, Cl. 252-429.00R.

Haggar Company: *See—*
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Hagner, Mats Bernhard; and Wendt, Karl Lennart. Method for sorting seeds. 3,992,814, Cl. 47-58.000.

Haimberger, Hans G.: *See—*
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Halasa, Adel Farhan, to Firestone Tire & Rubber Company, The. Process for polymerizing butadiene. 3,993,856, Cl. 526-140.000.

Hall, Charles M.; and Wright, John B., to Upjohn Company, The. Cyano phenylene dioxamic molecules. 3,993,679, Cl. 260-465.00D.

Halpern, Richard M. Method and apparatus for monitoring cellular activities. 3,993,560, Cl. 210-94.000.

Hammann, Ingeborg: *See—*
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Hammer, Theresa: *See—*
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Hammer, Victor, to Inner-Tite (A Division of Yara Engineering Corporation). Pipe line expansion plugs and tools. 3,993,103, Cl. 138-89.000.

Hamner, Glen P.: *See—*
Arey, William F., Jr.; Hamner, Glen P.; and Sawyer, Willard H., 3,993,598.

Hanf, Fritz, to Siemens Aktiengesellschaft. Delay line for traveling wave tubes. 3,993,924, Cl. 315-3.500.

Hankison, Paul M. Automatic valving device. 3,993,090, Cl. 137-195.000.

Hann, Mieczyslaw, to Politechnika Szczecinska. Telescopic column crane for stores in particular for cargo holds. 3,993,198, Cl. 212-127.000.

Hansen, David D.; and Sweeney, Eugene, to Caterpillar Tractor Co. Bottom guard arrangement for a track-type vehicle. 3,993,153, Cl. 180-69.100.

Hansen, Svend; and Sorensen, Nicolai Krebs, to Bang & Olufsen A/S. Automatic phonographs. 3,993,315, Cl. 274-9.00R.

Hansgen, Klaus: *See—*
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Hanyuda, Toshiaki: *See—*
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Harada, Kohsaburo; Matsumoto, Yousuke; and Kiyoshima, Rokurou, to Duraloy Blaw-Knox, Inc. Heat resisting alloys. 3,993,475, Cl. 75-134.00F.

Harada, Koosuke, to Seibu Denki Kogyo Co., Ltd. Magnetic signal mixing amplifier. 3,993,960, Cl. 330-63.000.

Harben, Grover S., Jr.; and Graham, Kenneth Z., to Gainesville Machine Company, Inc. Vacuum eviscerator method. 3,992,752, Cl. 17-45.000.

Hardigg, James S. Battery jar. 3,993,507, Cl. 426-176.000.

Harley, David N., to ITW Limited. Plastics fasteners. 3,993,277, Cl. 248-73.000.

Harmon, Peter P.: *See—*
Greenberg, Charles B.; and Harmon, Peter P., 3,993,845.

Harmony Emitter Company, Inc.: *See—*
Harmony, Richard C., 3,993,248.

Harmony, Richard C., to Harmony Emitter Company, Inc. Fluid flow regulator. 3,993,248, Cl. 239-107.000.

Harrelson, Albert A., Jr., to Harrelson Rubber Company. Lugged vehicle tire, and method of building same. 3,993,521, Cl. 156-96.000.

Harrelson Rubber Company: *See—*
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Harrington, Lance E.; and Lisa, Thomas, to Lisa, Thomas. Golf club. 3,993,314, Cl. 273-170.000.

Harrington, Walter J. Rotary apparatus with axially movable vanes. 3,993,417, Cl. 418-137.000.

Harris, Edward M.: *See—*
Dunnavant, William R.; Harris, Edward M.; Kurz, Philip F.; Markle, Richard A.; and Parker, Edward H., 3,993,684.

Harrison, Ronnie M.: *See—*
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Harrison, Stanley, to Aerosol Investments, Ltd. Spout for two-component resin dispenser. 3,993,224, Cl. 222-145.000.

Harshaw Chemical Company, The: *See—*
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Hart, Una L. Coloring pen assembly. 3,993,409, Cl. 401-199.000.

Hartfiel, Arlynn H.: *See—*
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Hartig, Ulrich: *See—*
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Hartig, Wolfgang; and Berges, Dietrich, to Barmag Barmer Maschinenfabrik Aktiengesellschaft. Two-for-one twisting process. 3,992,867, Cl. 57-156.000.

Hartlaub, Jerome T., to Honeywell Inc. Stress sensor diaphragms over recessed substrates. 3,994,009, Cl. 357-26.000.

Hartmann, Peter; and Theidel, Hans, to Bayer Aktiengesellschaft. Benzodifuran compounds. 3,993,670, Cl. 260-346.20M.

Harvey, John E. Scale system. 3,993,149, Cl. 177-163.000.

Hasbro Industries, Inc.: *See—*
Arons, Irving J.; Eller, Robert; and Merrill, Richard E., 3,993,408.

Hasegawa, Shinzo: *See—*
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Hashimoto, Masashi: *See—*
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Hassler, Heinrich: *See—*
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Hasunuma, Kenzo; Watanabe, Hideomi; and Tsuji, Nobuo, to Fuji Photo Film Co., Ltd. Polyester based adhesive. 3,993,629, Cl. 260-75.00T.

Haubner, Georg: *See—*
Schmaldienst, Peter; Meier, Werner; Haubner, Georg; and Wesemeyer, Jurgen, 3,993,031.

Haug, Werner. Device for transmitting information in the form of electrical signals to at least one mechanism for displaying or printing this information. 3,993,892, Cl. 235-61.0PG.

Haugsjaa, Paul Osborne; Regan, Robert James; and McNeill, William Henry, to GTE Laboratories Incorporated. Electrodeless light source. 3,993,927, Cl. 315-39.000.

Hauni-Werke Korber & Co., KG: *See—*
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Hauser, Kurt, to Suddeutsche Kuhlerfabrik, Julius Fr. Behr. Fan with fluid friction clutch. 3,993,415, Cl. 416-93.00R.

Hauser, Martin: *See—*
Douek, Maurice; Schmidt, Gustav A.; Malofsky, Bernard M.; and Hauser, Martin, 3,993,815.

Hawes, Frederick L., to Tetra Plastics, Inc. Explosive expansion means for attaching tubes to tube sheets. 3,993,001, Cl. 102-24.00R.

Hawkins, Donald W.: *See—*
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Hawkins, Harold M., to Phillips Petroleum Company. Production of unsaturated alcohols. 3,993,702, Cl. 260-632.00B.

Hay, Donald A.; Gregg, Peter T.; and Finlay, Walter L., to Copper Range Company. Process for dispersoid strengthening of copper by fusion metallurgy. 3,993,478, Cl. 75-159.000.

Hayashi, Motoshige: *See—*
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Hayashibara Biochemical Laboratories, Incorporated: *See—*
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Hayes, William F.: *See—*
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Haynie, Robert Nelson; and Pathak, Ramjee, to Federal-Mogul Corporation. Method of making powdered metal parts. 3,992,763, Cl. 29-420.500.

Hayssen Manufacturing Co.: *See—*
James, Robert C.; and Garczynski, Edward, 3,992,851.

Heath, Wesley Gene, to B & C Construction Company, Inc. Method and apparatus for installing insulation. 3,992,847, Cl. 52-743.000.

Hebert, Roger T.: *See—*
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Hedrick, Ross M.; and Gabbert, James D., to Monsanto Company. Polyester initiated anionic catalyzed polymerization of lactam. 3,993,709, Cl. 260-857.0PE.

Hefetz, Uriel. Method and device for extinguishing fires in oil wells. 3,993,137, Cl. 169-46.000.

Heide, Erich A.: *See—*
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Heim Universal Corporation: *See—*
McCloskey, Albert R., 3,993,369.

Heimsch, Robert A.; and Reaville, Eric T., to Monsanto Company. Multi-color laminate of photopolymer that is image-wise hydroperoxidized. 3,993,489, Cl. 96-77.000.

Heinrich, Ernst; and Ribka, Joachim, to Cassella Farbwerke Mainkur Aktiengesellschaft. 4-Nitro,2-alkylbenzene azo-3-cyano-4-methyl-6-hydroxy-2-pyridone dyeing of synthetic hydrophobic fibers. 3,993,441, Cl. 8-41.00C.

Held, Gedaliahu; and Murthy, K. R. Ananda, to TRW Inc. ELF communications system using HVDC transmission line as antenna. 3,993,989, Cl. 340-310.00R.

Hell, August; Weber, Klaus; and Escales, Eberhard, to AGFA-Gevaert, A.G. Method and arrangement for cutting and sorting photographic prints, and the like. 3,992,965, Cl. 83-27.000.

Hellstrom, Lennart Johan Yngve Johansson: *See—*
Davila, Octaviano Aguirre; and Hellstrom, Lennart Johan Yngve Johansson, 3,993,531.

Hemmi, Christian O.; and Hayes, William F., to Texas Instruments Incorporated. Amplitude modulation scanning antenna system. 3,993,999, Cl. 343-854.000.

Hendershot, William B., III: *See—*
Tallent, Michael W.; Scaggs, Lee E.; Swain, Allan L.; Harrison, Ronnie M.; and Hendershot, William B., III, 3,993,982.

Henderson, Cyril; and Tanaka, Akira, to American Safety Equipment Corporation. Vehicle door mounted continuous loop system. 3,993,328, Cl. 280-747.000.

Henkel & Cie G.m.b.H.: *See—*
Bruns, Klaus; and Meins, Peter, 3,993,697.

Henley, Virgil E.; Jellison, Frank R.; and Brown, Robert L., to General Tire & Rubber Company, The. Apparatus for applying belt strips to a tire carcass. 3,993,530, Cl. 156-405.000.

Henrick, Clive A.; and Staal, Gerardus B., to Zoecon Corporation. Control of mites with esters of cyclopropane substituted carboxylic acids. 3,993,773, Cl. 424-305.000.

Henriques de Gatztanondo, Carlos Alberto. Device for percutaneous paracentesis, injection, drainage and catheterization. 3,993,079, Cl. 128-347.000.

Henry, David W.; and Cory, Michael, to Stanford Research Institute. N-substituted 2-[2-(5-nitro-2-furyl) vinyl]imidazoles. 3,993,643, Cl. 260-240.00A.

Hentschel, Dietrich: *See—*
Brose, Horst; Depping, Karl Dieter; Hentschel, Dietrich; Kostevc, Bernard; and Schmidt, Klaus, 3,993,798.

Hentschel, Volkmar: *See—*
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Hercules Incorporated: *See—*
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Hermann Berstorff Maschinenbau GmbH: *See—*
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Hermanson, Herman A.: *See—*
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Hermes, Robert J.; and Turner, John F., to Birdsboro Corporation. Rolling mill. 3,992,915, Cl. 72-234.000.

Herrman, Arthur John: *See—*
Debbas, Samir Costandi; Herrman, Arthur John; and Swystun, Alexander Gregory, 3,993,812.

Herskovits, Imre. Mouth implant, a method of inserting the implant in the mouth, and a tool for machining the dental arch of the jaw for reception of the implant. 3,992,780, Cl. 32-10.00A.

Hess, Charles W., to Speco, Inc. Meat grinder cutter blade of the radial arm type. 3,993,255, Cl. 241-82.500.

Hess, Paul D.; and Spear, Robert E., to Aluminum Company of America. Sodium addition to aluminum. 3,993,477, Cl. 75-148.000.

Hester, Jackson B., Jr., to Upjohn Company, The. 2-[3-(Phthalimidomethyl)-5-methyl-4H-1,2,4-triazol-4-yl]benzophenones. 3,993,660, Cl. 260-308.00R.

Hetzel, Hartmut: *See—*
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Heubner, Ulrich: *See—*
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Heytmeijer, Herman R.; and Panaccione, Elmer S., to United States of America, Interior. Wax or plastic coated phosphor grains. 3,993,838, Cl. 428-403.000.

Hicks, Judy: *See—*
Guy, Cathy; and Hicks, Judy, 3,993,242.

Hieb, Arthur J. Irrigation system. 3,993,249, Cl. 239-177.000.

Higuchi, Makoto: *See—*
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Higuchi, Shigetaka; Hisagen, Yoshiaki; Mayuzumi, Tetsuya; and Tokita, Masatoshi, to Sony Corporation. Magnetic recording medium. 3,993,846, Cl. 428-447.000.

Higuchi, Takeru; Hussain, Anwar A.; and Shell, John W., to Alza Corporation. Bioerodible ocular device. 3,993,071, Cl. 128-260.000.

Hinderks, Mitja Victor. Pneumatic tire. 3,993,114, Cl. 152-340.000.

Hindin, Saul G.; and Dettling, Joseph C., to Engelhard Minerals & Chemicals Corporation. Rare earth containing catalyst composition. 3,993,572, Cl. 252-462.000.

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Hinton, Melvin F.; and Allport, Davies, to Reed Irrigation Systems. Flow controller device. 3,993,089, Cl. 137-116.300.

Hirai, Yukio: *See—*
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Hirayama, Yoshio: *See—*
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Hirsch, Albert Edgar; and Stinger, Henry Joseph, to Du Pont de Nemours, E. I., and Company. Electrically conductive elastomeric ink. 3,993,842, Cl. 428-421.000.

Hisagen, Yoshiaki: *See—*
Higuchi, Shigetaka; Hisagen, Yoshiaki; Mayuzumi, Tetsuya; and Tokita, Masatoshi, 3,993,846.

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Hlozek, Petr: *See—*
Muck, Eduard; Strachota, Jaroslav, deceased; Hlozek, Petr; and Horak, Josef, 3,993,618.

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Hodogaya Chemical Co., Ltd.: *See—*
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Nellen, Wilhelm; Fabian, Wolfgang; and Sevenich, Theodor, 3,993,086.

Hoff, Seymour, to Alza Corporation. Intrauterine device with seeker for finding the cervical os and housing member for fitting device in an inserter. 3,993,058, Cl. 128-130.000.

Hoffer, Max: *See—*
Grunberg, Emanuel; and Hoffer, Max, 3,993,761.

Hoffman, Douglas L. Gem faceting machine having an adjustable faceting head support assembly. 3,992,821, Cl. 51-125.000.

Hoffman, Neil R., to Kelsey-Hayes Company. Electrically operated disk brake. 3,993,173, Cl. 188-138.000.

Hoffmann-La Roche Inc.: *See—*
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Hollis, John Edward, to Plessey Handel und Investments AG. Solid state crosspoint circuit arrangement for use in a telephone exchange. 3,993,978, Cl. 340-166.00R.

Holt, Jack A., to Burke Company, The. Tie rod supported hanger for suspended concrete forms. 3,993,279, Cl. 248-235.000.

Holthuis, Johannes Jacobus, to Nederlandse Industrie voor Baggerwerktuigen Nivoba N.V. Incremental feed system. 3,993,565, Cl. 210-396.000.

Holtrop, John W.: *See—*
Bartels, Bruce; Holtrop, John W.; Liedtke, Larry L.; and Trovinger, Russell T., 3,992,976.

Homsy, Charles A. Implantable material and appliances and method of stabilizing body implants. 3,992,725, Cl. 3-1.000.

Honda, Tadayoshi, to Shimizu Construction Co., Ltd., The. Device for restricting the operation range of cranes. 3,993,986, Cl. 340-267.00C.

Honeywell Inc.: *See—*
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Hooper, Ralph W.; MacLeod, Douglas A.; and Murray, Clarence, to Interstate Oil Transport Company. Articulated push tug-barge thrust transmittal means. 3,993,014, Cl. 114-235.00R.

Hopson, Hazel L.: *See—*
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Hopwood, Francis W.; Staley, Lester K.; and Turlington, Thomas R., to United States of America, Air Force. Low noise parametric varactor diode crystal oscillator. 3,993,962, Cl. 331-18.000.

Horak, Josef: *See*—
Muck, Eduard; Strachota, Jaroslav, deceased; Hlozek, Petr; and Horak, Josef, 3,993,618.

Horbach, Stephen. Intermediate connector. 3,993,381, Cl. 339-17.0CF.

Horix Manufacturing Company: *See*—
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Horowitz, Alvin Edward. Topiary shaping frame. 3,992,812, Cl. 47-45.000.

Horvath nee Lengyel, Piroska; Institoris, Laszlo; Csanyi, Endre; and Vargha, Laszlo, to Chinoin Gyogyszer-es Vegyeszeti Termekek Gyara RT. 1,6-Dibromo-1,6-dideoxy-dulcitol and pharmaceutical compositions containing same. 3,993,781, Cl. 424-343.000.

Hoshino, Toshio: *See*—
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Hosokoshi, Kakuichiro; and Ashizaki, Shigeya, to Matsushita Electronics Corporation. Method for manufacture of color television picture tubes using rotating light source. 3,993,487, Cl. 96-36.100.

Hosooka, Shuichi, to Yoshida Kogyo Kabushiki Kaisha. Outer frame for dual sash window assembly. 3,992,817, Cl. 49-406.000.

Houston Natural Gas Corporation: *See*—
Ebner, Theran L.; and Hawkins, Donald W., 3,993,875.

Howanitz, Joseph; and Greenberg, Irwin, to Fine Organics Inc. Hard surface acid cleaner and brightener. 3,993,575, Cl. 252-142.000.

Howard, Sol; and Schaaf, Robert, to Air Filters, Inc. Carpeting tool for a vacuum cleaner. 3,992,748, Cl. 15-397.000.

Howe Furniture Corporation: *See*—
Burr, Alan C., 3,993,005.

Howell, Duane Aaron; and Walton, David G., to Kartridg Pak Co., The. Method and apparatus for making dual compartment package. 3,992,854, Cl. 53-14.000.

Howell, Stephen L., to Kimball International, Inc. Pulse generator for an electronic musical instrument. 3,992,973, Cl. 84-1.230.

Hruby, Peter: *See*—
Badat, Alois; and Hruby, Peter, 3,992,840.

Hubbard, Glenn Richard; Jacoby, Harold John; Ecker, Frank Allen; Haffner, Donald Gene; and Saiia, Anthony Joseph, to Jacobsen Manufacturing Company. Hydraulic system for controlling a gang of lawn mowers. 3,992,858, Cl. 56-7.000.

Huddleston, Lewis E. Wheel lock for motorcycles and the like. 3,992,906, Cl. 70-18.000.

Huebner, Charles H.: *See*—
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Hughes Aircraft Company: *See*—
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Huiskes, Martinus C., to Koppers Company, Inc. Folding apparatus for corrugated paperboard blanks. 3,992,982, Cl. 93-52.000.

Hulak, Pavel: *See*—
Prochazka, Hubert; Stamberg, Karel; Jilek, Rudolf; Hulak, Pavel; and Katzer, Josef, 3,993,558.

Hulinsky, Josef. Apparatus for mounting a window or a door frame. 3,992,833, Cl. 52-206.000.

Hull, John R.: *See*—
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Hulme, John Kenneth, to Societa Italiana Elettronica S.p.A. Shutter for optical detection. 3,993,900, Cl. 250-229.000.

Hummel, Francis F. Method and means for conveying items. 3,993,204, Cl. 214-89.000.

Hunicke, Wolfgang: *See*—
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Hunt, Guilbert M.; Groth, Hugh F.; and Bochmann, Carl E., to Booz Allen & Hamilton, Inc. Method and apparatus for adhesively joining a plurality of superimposed material layers by a needling operation. 3,993,523, Cl. 156-148.000.

Huntec (70) Limited: *See*—
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Hunter, James B., to Matthey Bishop, Inc. Catalyst support assembly. 3,993,600, Cl. 252-465.000.

Huntington Alloys, Inc.: *See*—
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Hurx, Adrianus Antonius; 'T Veld, Jan Man in; and Sygall, Peter Ivan, to U.S. Philips Corporation. Method of manufacturing a tubular lamp envelope. 3,993,465, Cl. 65-110.000.

Hussain, Anwar A.: *See*—
Higuchi, Takeru; Hussain, Anwar A.; and Shell, John W., 3,993,071.

Hutchins, Roger; Orton, Tony William; and Thai, Nguyen, to Huntec (70) Limited. Underwater transient sound generator having pressure compensating fillet. 3,993,973, Cl. 340-8.0PC.

Hutton, Maurice F.; and Friedland, Bernard, to Singer Company, The. Control system for angular displacement sensor. 3,992,952, Cl. 73-505.000.

Hwa, Jesse C. H.; and Kraft, Paul, to Stauffer Chemical Company. Process for forming fire retardant polymers of bis (hydrocarbyl) vinylphosphonate. 3,993,715, Cl. 260-884.000.

Hwang, Un-Pah: *See*—
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Hydril Company: *See*—
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Iacobelli, Jerome Anthony: *See*—
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Iberg, Willard J.; and Keathley, Claude H., to Emerson Electric Co. Space thermostat. 3,993,120, Cl. 165-26.000.

Ichii, Hirokazu, to Fuji Photo Film Co., Ltd. Film forwarding mechanism. 3,994,006, Cl. 354-212.000.

Ichimura, Takeo; and Kaneko, Teruo, to Nippon Kogaku K.K. Glass body having a fluorescent pattern inwardly of a surface thereof and method of making same. 3,993,797, Cl. 427-64.000.

Idaho Research Foundation, Inc.: *See*—
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Ide, Allan R. Cargo transport system. 3,993,200, Cl. 214-14.000.

Idealspaten-und Schaufelwalzwerke A. Bredt & Co. KG: *See*—
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Idemitsu Kosan Co., Ltd.: *See*—
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Igel, Wolfgang, to Zinser Textilmaschinen GmbH. Method of and apparatus for automatic reattachment of threads in spinning machines. 3,992,864, Cl. 57-34.00R.

Iida, Wataru: *See*—
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Ikeda, Kojuro: *See*—
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Imazato, Tetsuya: *See*—
Yamanishi, Akio; and Imazato, Tetsuya, 3,993,620.

Imberg, Bengt Uno; Karlsson, Kurt Hakan; and Orke, Gustav Georg, to U.S. Philips Corporation. Supply wave guide system in microwave ovens. 3,993,886, Cl. 219-10.55F.

Imhoff, William B., to Leigh Products, Inc. Automatic surface bolt. 3,993,337, Cl. 292-332.000.

Immordino, Vincent J., to Display Originals, Inc. Turret for supporting box-dispensing units. 3,993,196, Cl. 211-49.00D.

Imperial Chemical Industries Limited: *See*—
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Davis, John Brian; Skilling, Derek; and Wrigley, Nigel Edwin, 3,993,723.
Fishwick, Brian Ribbons; Boyd, Violet; and Glover, Brian, 3,993,438.
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McColl, Ian Stuart; and Pugh, Ashley Cedric Pardoe, 3,993,705.
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Ridyard, Denis Robert Annesley, 3,993,440.

Imperical Chemical Industries Ltd.: *See*—
Jones, John Prys Morgan, 3,993,462.

Inaba, Yoshiharu; and Kawanobe, Toru, to Hitachi, Ltd. Method for electroless plating gold directly on tungsten or molybdenum. 3,993,808, Cl. 427-377.000.

Industrie Pirelli S.p.A.: *See*—
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Industries Chimiques de Voreppe: *See*—
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Institut National de la Recherche Agronomique: *See*—
Maubois, Jean-Louis Joseph; Culioli, Joseph; Chopin, Alain; and Chopin, Marie-Christine, 3,993,636.

Institut National de la Sante et de la Recherche Medicale: *See*—
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Intermen Corporation: *See*—
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International Business Machines Corporation: *See*—
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Baker, Theodore H.; Ghafghaichi, Majid; Stevens, Richard C.; and Tuman, Daniel, 3,993,934.
Barkhuff, Earl D.; Borm, David S.; McGinnis, Bernard W.; and Rosenlund, Bertel E., 3,994,017.
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Kalter, Howard Leo, 3,993,917.
Kranik, John R.; and Mueller, Wolfgang F., 3,993,018.

International Computers Limited: *See*—
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International Paper Company: *See*—
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International Product Development Incorporated: *See*—
Awalt, Rockland Karl, 3,992,873.
International Shoe Machine Corporation: *See*—
Vornberger, Walter, 3,992,743.
International Telephone and Telegraph Corporation: *See*—
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International Top Security Corporation: *See*—
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Interpace Corporation: *See*—
Galliath, Andre Paul; and Weis, Valentine Eugene, 3,993,495.
Interstate Oil Transport Company: *See*—
Hooper, Ralph W.; MacLeod, Douglas A.; and Murray, Clarence, 3,993,014.
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Chiari, Natale; Calabria, Valerio; and Inverardi, Giuseppe, 3,992,866.
Ion, Elizabeth Edwinia. Tubular measuring medical instruments. 3,993,045, Cl. 128-2.00S.
Iowa State University Research Foundation, Inc.: *See*—
Troeh, Frederick R., 3,992,927.
Ippolito, James: *See*—
Kinsinger, William C.; and Ippolito, James, 3,993,405.
Irani, Mazin R., to Stauffer Chemical Company. Food grade alkali metal phosphates from wet process H_3PO_4. 3,993,733, Cl. 423-313.000.
Irani, Mazin R., to Stauffer Chemical Company. Cleanup of wet process phosphoric acid. 3,993,735, Cl. 423-321.00R.
Irani, Mazin R., to Stauffer Chemical Company. Food grade phosphoric acid from wet process acid. 3,993,736, Cl. 423-321.00S.
Isaac, Peter A. H.; and Oulton, T. Dixon, to Engelhard Minerals & Chemicals Corporation. Reduced charge montmorillonite pigment for sensitizing record material. 3,993,500, Cl. 106-288.00B.
Isaksson, Sven-Erik; and Jakobsson, Bo Christer, to Allmanna Svenska Elektriska Aktiebolaget. Cylindrical elongated furnace for treating material at high temperature in a gaseous atmosphere under high pressure. 3,993,433, Cl. 432-247.000.
Ishikawa, Makoto: *See*—
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Israel, John W.: *See*—
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Itek Corporation: *See*—
Buchan, William R.; and Moore, Robert A., 3,993,825.
Ito, Kanichi; and Hirayama, Yoshio, to Ebara Manufacturing Co., Ltd. Method and apparatus for recovering crude pulp stock from municipal waste. 3,993,252, Cl. 241-21.000.
Ito, Tadashi: *See*—
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Ivester, Andrew S., to Polaroid Corporation. Self-developing camera with film unit deflecting structure. 3,994,002, Cl. 354-86.000.
Iwashita, Tomonori; Aizawa, Hiroshi; Kozuki, Susumu; and Uchidoi, Masanori, to Canon Kabushiki Kaisha. Motor-driven operating apparatus for a photographic camera. 3,994,003, Cl. 354-173.000.
J. E. Love Company: *See*—
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J. M. Huber Corporation: *See*—
Wason, Satish K., 3,993,497.
Jackson, Brian W., to Eastman Kodak Company. Apparatus for coating a substrate. 3,993,019, Cl. 118-50.000.
Jackson, Homer E., to Navsat Corporation. Communication system and method. 3,993,997, Cl. 343-112.0CA.
Jackson, Jack M.; and Hartfiel, Arlynn H., to Chemical Additives Company. Water loss reduction agents. 3,993,570, Cl. 252-8.50A.
Jackson, James C., to Ethyl Corporation. Method of making a thermal barrier construction element. 3,992,769, Cl. 29-416.000.
Jacobsen Manufacturing Company: *See*—
Hubbard, Glenn Richard; Jacoby, Harold John; Ecker, Frank Allen; Haffner, Donald Gene; and Saiia, Anthony Joseph, 3,992,858.
Jacobson, Howard Wayne; and Lewis, George Leoutsacos, to Du Pont de Nemours, E. I., and Company. Process for producing a particulate mullite fibril containing composition. 3,993,499, Cl. 106-288.00B.
Jacobsson, Kurt Arne Gunnar, to Aktiebolaget IRO. Thread delivery device, particularly for textile machines. 3,993,258, Cl. 242-47.120.
Jacoby, Harold John: *See*—
Hubbard, Glenn Richard; Jacoby, Harold John; Ecker, Frank Allen; Haffner, Donald Gene; and Saiia, Anthony Joseph, 3,992,858.
Jacoby, Jerold L.; and Wright, James E., to TRW Systems and Energy. Universal holographic optics orientation assembly. 3,993,399, Cl. 350-3.500.
Jaeger, Hans; Kotthaus, Erich; and Raess, Ulrich, to Werkzeugmaschinenfabrik Oerlikon-Buhrle AG. Apparatus for lapping and testing two meshing gears whose axes enclose a random angle with one another. 3,992,937, Cl. 73-162.000.
Jakobsson, Bo Christer: *See*—
Isaksson, Sven-Erik; and Jakobsson, Bo Christer, 3,993,433.
James, Joseph W. Collapsible stool. 3,993,003, Cl. 108-112.000.
James, Robert C.; and Garczynski, Edward, to Hayssen Manufacturing Co. Packaging apparatus. 3,992,851, Cl. 53-182.00R.
Janda, Richard M.; and Williams, Kenneth C., to Rockwell International Corporation. Seamless garment including method of and machine for knitting the same. 3,992,903, Cl. 66-177.000.
Janes, Allan, to Janes, Allan. Anti-reverse means for central dictation equipment. 3,993,878, Cl. 179-100.1DR.
Jansen, Mary Jo. Baby bottle holder. 3,993,274, Cl. 248-107.000.
Janson, August; and Chynoweth, Douglas John. Air conditioning system. 3,992,896, Cl. 62-238.000.
Japan Exlan Company Limited: *See*—
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Japan Gasoline Co., Ltd.: *See*—
Morikawa, Kiyoshi; Nishida, Fusao; Yamada, Tomiaki; Suzuki, Noriyuki; Takeda, Takehiko; Yanagihara, Tsutomu; Adachi, Katshiko; Asanabe, Tadashi; Ohsato, Katuaki; and Tsuda, Kintaro, 3,993,731.
Jarman, Davis R., to Hinson, Virgil, a part interest. Sheet metal pulling power head and stand. 3,992,919, Cl. 72-447.000.
Jarman, Davis R., to Hinson, Virgil, a part interest. Body sill clamp. 3,992,921, Cl. 72-457.000.
Jarrett, Graham; and Staniland, Philip Anthony, to Imperial Chemical Industries Limited. Mixture of thermoplastic aromatic copolyetherketone/sulphone and a sulpur-containing material and method of crosslinking the same. 3,993,628, Cl. 260-49.000.
Jaulmes, Eric, to Ateliers de la Motobecane. Injector support for direct injection engines. 3,993,030, Cl. 123-32.00R.
Jaworski, Eugene: *See*—
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Jay, Walter M. Water saving toilet device. 3,992,728, Cl. 4-67.00R.
Jellison, Frank R.: *See*—
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Jenkins, James F.: *See*—
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Jenks, Herbert R. Laminated fiberglass tennis racket. 3,993,308, Cl. 273-73.00F.
Jensen, Harald: *See*—
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Jess, Thurman S., to Baxter Laboratories, Inc. Hydrophobic valve. 3,993,062, Cl. 128-214.00R.
Jilek, Rudolf: *See*—
Prochazka, Hubert; Stamberg, Karel; Jilek, Rudolf; Hulak, Pavel; and Katzer, Josef, 3,993,558.
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Kovich, Louis. Manually operated agitator for thixotropic suspensions. 3,993,290, Cl. 259-29.000.
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Kralowetz, Bruno. Forging machine. 3,992,917, Cl. 72-407.000.
Krambeck, Robert Harold: *See—*
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Kramer, Daniel E. Defrost controls for refrigeration systems. 3,992,895, Cl. 62-155.000.
Kramer, Gunter; Ness, Peter; and von Dohren, Hans-Hermann, to Varta Batterie Aktiengesellschaft. Method for the manufacture of a negative electrode containing a discharge reserve for gas-tight alkaline storage batteries. 3,993,504, Cl. 427-126.000.
Kramer, L. Jonathan: *See—*
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Kramer, Wolfgang: *See—*
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Kranik, John R.; and Mueller, Wolfgang F., to International Business Machines Corporation. Centrifugal support for workpieces. 3,993,018, Cl. 118-52.000.
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Kubick, Mark, to Pallet Development Inc. Pallet. 3,993,168, Cl. 108-53.100.
Kuehn, Lorne A.; and McHattie, Lloyd E., to Canada, Her Majesty the Queen in right of, as represented by the Minister of National Defence. Apparatus for determining wet bulb globe temperature. 3,992,942, Cl. 73-336.500.
Kuhn, Wilfried; and Krause, Horst, to VEB Polygraph Leipzig Kombinat fur Polygraphische Maschinen und Ausrustungen. Sheet transfer system for a printing machine. 3,992,993, Cl. 101-409.000.
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Kulbakh, Valter Osvaldovich; and Popova, Inesa Vladimirovna. Pharmaceutical composition containing the N-methyl-d-glucosamine complex of 4-methyluracil and use thereof. 3,993,755, Cl. 424-180.000.
Kulite Semiconductor Products, Inc.: *See—*
Brosh, Amnon; and Wasserman, Jacob, 3,993,150.
Kull, Leo. Motion translating mechanism for indexing and escapement drives. 3,992,954, Cl. 74-1.500.
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Kurihara, Masaru; Ikeda, Kojuro; Dokoshi, Noriaki; and Kobayashi, Akio, to Toray Industries, Inc. Permselective polymeric membranes of organic polyamide or polyhydrazide. 3,993,625, Cl. 260-47.0CP.
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Lange, Harold Carl: *See—*
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Langenstein & Schemann Aktiengesellschaft: *See—*
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Langer, Heimo J.; and McKillip, William J., to Ashland Oil, Inc. Bonding of rubber to reinforcing elements. 3,993,836, Cl. 428-383.000.

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Larkin, Wallace Keith. Acoustical communications headset. 3,993,879, Cl. 179-156.00A.

Larrabee, Edward W., to Union Carbide Corporation. Protective shielding assembly for use in loading a hypodermic syringe with radioactive material. 3,993,063, Cl. 128-215.000.

La Rue, Landon. Jar lid mouse trap. 3,992,802, Cl. 43-61.000.

Laurent, Jacques: *See—*
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Laurila, Jaakko Johanes, to Ferrox AB. Cleaning unit for internal mechanical cleaning of containers such as moulds. 3,992,745, Cl. 15-56.000.

Laurito, James J., to Neville Chemical Company. Production of ethyl cellulose-compatible phenol-modified hydrocarbon resins for use in printing inks. 3,993,626, Cl. 260-47.0UA.

Lavrovsky, Evgeny Anatolievich: *See—*
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Lazarus, Anthony C. Carpet roll identification bracket and inventory card. 3,992,794, Cl. 40-309.000.

Le Carbone Lorraine: *See—*
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Leach, Bruce E.; and Starks, Charles M., to Continental Oil Company. Methylation of α-naphthol to 2-methyl-1-naphthol. 3,993,701, Cl. 260-621.00R.

LeBocey Industries: *See—*
Palencher, Jacques, 3,993,104.

Lebowitz, Elliot; and Greene, Margaret W., to United States of America, Energy Research and Development Administration. Production of high purity radiothallium. 3,993,538, Cl. 176-11.000.

Lee, Man Shek, to GTE Automatic Electric Laboratories Incorporated. Single amplifier network for simulating an inductor. 3,993,968, Cl. 333-80.00R.

Lee Wilson Engineering of Canada: *See—*
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Leech, Edward J.: *See—*
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Leedom, Marvin Allan; and Bleazey, John Clifford, to RCA Corporation. Disc record groove skipper. 3,993,863, Cl. 178-6.6DD.

Leeper, Harold M.: *See—*
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Lei, George Y.: *See—*
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Leib, Kenneth G., to Grumman Aerospace Corporation. Method and apparatus for forming erasable, real time, optical circuits. 3,993,400, Cl. 350-96.00C.

Leiby, George J.: *See—*
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Lein, Werner: *See—*
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Leitold, Matyas: *See—*
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Lemery, Jean Paul; and Pithois, Gaston, to Garcia Corporation. Fishing reel. 3,993,263, Cl. 242-84.21R.

Lemoine, Maurice G.; and Pasdera, Leonard A., to Ampex Corporation. Last line velocity compensation. 3,994,013, Cl. 358-8.000.

Lender, Adam; and Olszanski, Henry H., to GTE Automatic Electric Laboratories Incorporated. Apparatus and method for digitally generating a modified duobinary signal. 3,993,953, Cl. 325-38.00A.

Leonard, Ronald J.; and Takagishi, Jonathan Wayne, to Baxter Laboratories, Inc. Cardiotomy reservoir. 3,993,461, Cl. 55-178.000.

Lessard, Normand, to Bombardier Limited. Self adjusting floating caliper disc brake. 3,993,170, Cl. 188-71.900.

Lett, Robert B., III. Method of inner packaging of articles of furniture. 3,992,849, Cl. 53-27.000.

Lewis, Edward; and Michalowski, Edward. Modular rail fence. 3,993,289, Cl. 256-59.000.

Lewis, George Leoutsacos: *See—*
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Lewis, J. Stephen: *See—*
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Lewis, Jesse M. Method and means of multiple doweling for laminating crossties. 3,992,767, Cl. 29-429.000.

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L'Hommedieu, Jesse H.: *See—*
Fischman, Martin; and L'Hommedieu, Jesse H., 3,993,930.

Libit, Lawrence. Preparation of prostaglandin intermediates. 3,993,664, Cl. 260-343.30R.

Liedtke, Larry L.: *See—*
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Linde Aktiengesellschaft: *See—*
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Lindeberg, Sven-Erik, to Telefonaktiebolaget L M Ericsson. Contact spring set. 3,993,883, Cl. 200-283.000.

Lindeman, Richard Jay, to Illinois Tool Works Inc. Sheet metal fastener. 3,993,272, Cl. 248-73.000.

Linden-Alimak AB: *See—*
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Lindsay, Ernest Harold, Jr., to Illinois Tool Works Inc. Rod retainer. 3,993,410, Cl. 403-13.000.

Lindstedt, Ernst Lennart: *See—*
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Lisenbee, Wayne F.; and Nelson, Keith E., to Dynatech Corporation. Disposable, defrostable cryosurgical probe. 3,993,075, Cl. 128-303.100.

List, Karl-Hermann: *See—*
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Liu, Bede: *See—*
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Ljung, Bo H.; and Friedland, Bernard, to Singer Company, The. Accelerometer using radioactive pickoff. 3,992,953, Cl. 73-517.00B.

Locke, Robert A., to Sperry Rand Corporation. Drive mechanism for an asynchronous printer. 3,993,180, Cl. 197-49.000.

Loctite Corporation: *See—*
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Loebich, Friedrich: *See—*
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Loft, John T.: *See—*
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Logan, Ralph Andre; and Reinhart, Franz Karl, to Bell Telephone Laboratories, Incorporated. Heterostructure devices, a light guiding layer having contiguous zones of different thickness and bandgap and method of making same. 3,993,963, Cl. 331-94.50H.

Lohmann, Jorg: *See—*
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Long, Alvin W., Jr.; Blumberg, Marvin R.; and Totah, Sami E. Automatic parking lot gate. 3,993,975, Cl. 340-51.000.

Long, Fred M.; and Sawyer, Willard H., to Exxon Research and Engineering Company. Process for preparing a heavy crude conversion catalyst. 3,993,601, Cl. 252-462.000.

Long, Raymond H.; and Bauer, William V., to Lummus Company, The. Desulfurization of iron oxide pellets. 3,993,472, Cl. 75-4.000.

Longenecker, John G., to Automation International Corporation. Continuous high-speed cooking and cooling method using pre-heated ingredients and predetermined radiant heating patterns for the production of tortillas and similar products. 3,993,788, Cl. 426-243.000.

Longton, Peter Bryan; and Cowen, Henry Chapman, to United Kingdom Atomic Energy Authority. Helium cooled nuclear reactors. 3,993,540, Cl. 176-37.000.

Longwell, John P.: *See—*
Cahn, Robert P.; Longwell, John P.; and Wythe, Stephen L., 3,993,457.

Longworth, Michael W., to Ampex Corporation. Tape spool. 3,993,262, Cl. 242-71.800.

Loos, John H., to General Motors Corporation. Room air conditioner grounding clip. 3,992,897, Cl. 62-262.000.

Lorteije, Jean Hubertus Josef; and Whelan, Maurice Vincent, to U.S. Philips Corporation. Device for driving or energizing a display device. 3,993,991, Cl. 340-324.00R.

Lorusso, Anthony M.: *See—*
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Loseff, Herbert S. Suction tube and retrograde flushing for wounds, body cavities and the like. 3,993,080, Cl. 128-350.00R.

Love, Gordon David. Disintegrated devices. 3,993,253, Cl. 241-46.110.

Loveless, Stanley M., to General Gas Light Company. Manifold and valve system. 3,993,091, Cl. 137-269.000.

Lowery, Leroy, Sr. Scrubber and combustion apparatus. 3,993,448, Cl. 23-262.000.

Lu, Brun & Associes S.A.: *See—*
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Lucas, Edwin K. Ladder lifting and leveling device. 3,993,275, Cl. 248-188.200.

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Cope, Raymond, 3,992,883.
Simmons, John Richard, 3,993,418.

Ludwig, Frank A., to Ford Motor Company. Secondary battery or cell with composite electrode. 3,993,503, Cl. 429-103.000.

Lukens, Floyd W., Jr., to ACF Industries, Incorporated. Connection of actuator cylinder housing to valve bonnet. 3,993,284, Cl. 251-63.600.

Lukey, Robert A.: *See—*
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Lumm, Benjamin, Jr., to Lawrence Peska Associates, Inc., a part interest. Combined extension cord and grounding device. 3,993,380, Cl. 339-14.0RP.

Lummus Company, The: *See—*
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Lussier, Stephen E., to Lawrence Peska Associates, Inc., a part interest. Drag chute for bicycle. 3,993,323, Cl. 280-289.00R.

Lynch, John Patrick. Astrological comparison apparatus and daily astrology wheel. 3,992,787, Cl. 35-44.000.

Lynn A. Williams Engineering Company: *See—*
Williams, Lynn A.; Costello, George P.; and Malkowski, Leonard R., 3,993,174.

Machinefabriek Mokfeld B.V.: *See—*
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MacLeod, Douglas A.: *See—*
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MacRae, Donald R., to Bethlehem Steel Corporation. Method of reducing iron oxide. 3,993,473, Cl. 75-11.000.

Madsen, Richard A.: *See—*
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Maeda, Satoshi; Kondo, Atsushi; and Nishimura, Shinzi, to Hodogaya Chemical Co., Ltd. Process for producing xylylene glycols. 3,993,699, Cl. 260-618.00R.

Maeda, Toru: *See—*
Chimura, Kazuya; Kaneko, Takashi; Takashima, Shunichi; Nakazono, Ryuichi; Kawashima, Masao; Ota, Hiroyuki; Tamura, Kenji; Kagawa, Kazunori; Shimada, Kazushi; Maeda, Toru; Anzai, Hisao; Takoi, Kenji; and Sakunaga, Kenichi, 3,993,834.

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Maekawa, Yukio; Satomura, Masato; and Umehara, Akira, to Fuji Photo Film Co., Ltd. Light-sensitive high molecular weight compound capable of being cross-linked by irradiation with light or an electron beam. 3,993,624, Cl. 260-47.0UA.

Magendans, Frederik; and te Raa, Gerhardus Albertus, to U.S. Philips Corporation. Coating for X-ray tube rotary anode surface remote from the electron target area. 3,993,923, Cl. 313-330.000.

Magnetic Controls Company: *See—*
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Magno, Douglas J.; and Bing, Frank, Jr. Method and apparatus for detecting non-parallel reed switch contacts. 3,993,949, Cl. 324-28.00R.

Maiershofer, Helmut Carl: *See—*
Duel, Don Myrton; and Maiershofer, Helmut Carl, 3,992,737.

Maire, Jacques: *See—*
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Maison Murat: *See—*
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Maitani, Yoshihisa; Shimoyama, Kunio; Yoshida, Muneaki; Hashimoto, Akihiko; and Kitagawa, Masahiro, to Olympus Optical Co., Ltd. Photometric apparatus for single lens reflex camera. 3,994,001, Cl. 354-51.000.

Maki, Isamu; Kiuchi, Masashi; Watanabe, Toshio; Shoji, Saburo; Sato, Mitsuo; Kanai, Tatsuyoshi; and Komatsu, Toshiyuki, to Canon Kabushiki Kaisha. Liquid developer for electrostatic image. 3,993,483, Cl. 96-1.0LY.

Makino, Yoshimi, to Sony Corporation. Apparatus for measuring the direction and relative position between a body and a pick-up using a magnetoresistive pick up. 3,993,946, Cl. 324-34.00D.

Malkowski, Leonard R.: *See—*
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Malofsky, Bernard M.: *See—*
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Maltby, Frederick L.; Kramer, L. Jonathan; and Loewenstern, Kenneth M., to Drexelbrook Controls, Inc. Admittance measuring system for monitoring the condition of materials. 3,993,947, Cl. 324-60.00R.

Mandell, Michael I.: *See—*
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Mangin, Daniel: *See—*
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Mango, Louis A., III, to General Electric Company. Flame resistant polystyrene. 3,993,635, Cl. 260-42.180.

Mannesmann Aktiengesellschaft: *See—*
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Neitzel, Hans Walter, 3,993,202.
Schiefer, Peter; and Bosebeck, Heinz, 3,992,943.

Manni, Mario, to Manni, Mario; and Vizioli, Don, part interest to each. Portable spreader for particulate material. 3,993,225, Cl. 222-324.000.

Marcussen, Hans Wilhelm, Jr.: *See—*
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Marien, Jan A.; and Steinberg, David R., to Corning Glass Works. Electrical component hermetic enclosure. 3,993,938, Cl. 317-230.000.

Marinkovich, Phillip S.: *See—*
Atherton, Richard; Marinkovich, Phillip S.; Spadaro, Peter R.; and Stout, J. Wilson, 3,993,539.

Marino, Vincent. Printed circuit electrical connectors. 3,993,383, Cl. 339-17.00L.

Markle, Richard A.: *See—*
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Markofsky, Sheldon B.; and Wood, Louis L., to W. R. Grace & Co. Process and composition for breaking emulsions. 3,993,615, Cl. 260-29.2TN.

Marks, Michael R.; and Strickland, James P., Jr., to Textron, Inc. Chain brake for chain saw. 3,992,779, Cl. 30-381.000.

Marola, Americo E.; and Hull, John R., to Torrington Company, The. Overrunning clutch. 3,993,176, Cl. 192-45.000.

Marquis, Ray L.: *See—*
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Marsh, Frank Dennis; and McIntosh, Colin Leslie, to Du Pont de Nemours, E. I., and Company. Para-nitrobenzotribromide process. 3,993,704, Cl. 260-646.000.

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McCarthy, Charles J.; Charles, Steven; and Eichenbaum, Daniel M., to United States of America, Health, Education and Welfare. One-handed syringe. 3,993,064, Cl. 128-218.00A.

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McCloskey, John T.; and Villavicencio, Eduardo J., to Process Evaluation and Development Corporation. Method for cleaning bagasse fiber using a U-shaped wash path. 3,992,754, Cl. 19-66.00R.

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McLennand, Richard G., to Horix Manufacturing Company. Container-filling machine with level sensing and blowdown. 3,993,111, Cl. 141-90.000.

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Meador, Richard A.; Cox, Percy T.; and Thompson, Larry W., to Texaco Inc. Movable oil measurement combining dual radio frequency induction and dual induction laterolog measurements. 3,993,944, Cl. 324-6.000.

Meauze, Georges D.; Thibert, Jean-Jacques; and Leynaert, Jacky R., to Office National d'Etudes et de Recherches Aerospatiales (O.N.E.R.A.). Supersonic compressors. 3,993,414, Cl. 415-181.000.

Medlin, Glenn D.; and Medlin, Glenn D., Jr. Heat pump conversion system for electric furnace. 3,993,121, Cl. 165-29.000.

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Mott, James D., to Hydril Company. Apparatus for operating a closure element of a subsurface safety valve and method of using same. 3,993,136, Cl. 166-314.000.

Mottu, Francoise: *See—*
Mauron, Jean; Finot, Paul-Andre; and Mottu, Francoise, 3,993,795.

Moulding, Thomas S. Device for timed removal and replacement of a specimen container. 3,993,452, Cl. 23-259.000.

Mounts, William T., to Caterpillar Tractor Co. Rear wall structure for a vehicle cab. 3,993,346, Cl. 296-84.00N.

Moyer, Richard L., to Hercules Incorporated. Methods of making continuous length reinforced plastic articles. 3,993,726, Cl. 264-174.000.

MTS Systems Corporation: *See—*
Petersen, Niel R., 3,992,978.

Muck, Eduard; Strachota, Jaroslav, deceased (by Strachotova, Vera, legal representative); Hlozek, Petr; and Horak, Josef, to Statni vyzkumny ustav kozedelny. Coatings for fibrous sheet material of polyurethane and oil-like hydrocarbon polymer. 3,993,618, Cl. 260-33.6UB.

Mueller, Franz-Josef: *See—*
Stabenow, Joachim; Wunsch, Gerd; Deigner, Paul; Mueller, Franz-Josef; Loeser, Werner; and Steck, Werner, 3,993,807.

Mueller, Karl, to Xerox Corporation. Method and apparatus for fuser assembly cooling in an electrostatographic machine. 3,993,124, Cl. 165-89.000.

Mueller, Wolfgang F.: *See—*
Kranik, John R.; and Mueller, Wolfgang F., 3,993,018.

Mukae, Satoshi; and Shiota, Yoshitaka, to Mitsui Mining & Smelting Co., Ltd. Automatic leaching system for hydro-metallurgical production of zinc. 3,993,293, Cl. 266-80.000.

Mukai, Kosaburo; Shinzawa, Motohiro; and Yasuhara, Seishi, to Nissan Motor Co., Ltd. Spark ignition engine having combustion chamber provided with vent valve. 3,993,037, Cl. 123-191.00S.

Muller, Erich: *See—*
Nickl, Josef; Muller, Erich; Narr, Berthold; Haarmann, Walter; Schroter, Wolfgang; and Kadatz, Rudolf, 3,993,683.

Muller, Hans, to Grapha-Holding AG. Transporting arrangement. 3,993,188, Cl. 198-461.000.

Muller, Wolfgang: *See—*
Chattopadhayay, Asoke; and Muller, Wolfgang, 3,993,033.

Mullin, A. Donald, to Lawrence Peska Associates, Inc., a part interest. Cat scratching post. 3,993,027, Cl. 119-29.000.

Multi-State Devices Ltd.: *See—*
Meijer, Robert S., 3,993,983.

Multiplex Communications, Inc.: *See—*
Schwartz, Norman L., 3,993,870.

Multivac Sepp Haggenmueller KG: *See—*
Vetter, Arthur, 3,992,850.

Murashima, Ryoichiro: *See—*
Yokoyama, Kazumasa; Yamanouchi, Koichi; Murashima, Ryoichiro; and Watanabe, Ryozo, 3,993,581.

Murphy, Howard G.: *See—*
Schmidt, Harvey E.; Grace, Michael H.; and Murphy, Howard G., 3,993,942.

Murray, Clarence: *See—*
Hooper, Ralph W.; MacLeod, Douglas A.; and Murray, Clarence, 3,993,014.

Murray, Jerome L.; and Gardiner, Frances R. Monolithic sanitary device. 3,993,074, Cl. 128-286.000.

Murthy, K. R. Ananda: *See—*
Held, Gedaliahu; and Murthy, K. R. Ananda, 3,993,989.

Murvall, Ake Eugen, to ABU Aktiebolag. Fishing reels. 3,993,267, Cl. 242-217.000.

Myers, John W., to Phillips Petroleum Company. Activating Group VIII metal/alumina catalysts with halosilane. 3,993,594, Cl. 252-442.000.

Myers, Philip Lawrence, to RCA Corporation. Automatic assembly of semiconductor devices. 3,992,770, Cl. 29-591.000.

Nachbur, Hermann: *See—*
Mayer, Fritz; Kern, Jorg; and Nachbur, Hermann, 3,993,852.

Nagano, Takahiro: *See—*
Misawa, Yutaka; Kamei, Tatsuya; and Nagano, Takahiro, 3,994,011.

Nagaoka, Kozo: *See—*
Demain, Arnold L.; and Nagaoka, Kozo, 3,993,544.

Nagatuma, Kazuyuki; Akiyama, Seikichi; Kozuka, Hirotugu; and Kobayashi, Masayoshi, to Hitachi, Ltd. Method of producing single crystals of gadolinium molybdate family. 3,993,534, Cl. 156-617.0SP.

Nakabayashi, Hirotomo; Ohura, Kikuo; Fujita, Nobuhito; Miyakawa, Shintaro; Saito, Tukasa; and Higuchi, Makoto, to Nippon Oil Seal Industry Co., Ltd. Rotary molder. 3,993,787, Cl. 425-125.000.

Nakaguti, Osamu: *See—*
Kamiya, Takashi; Saito, Yoshihisa; Teraji, Tsutomu; Nakaguti, Osamu; Oku, Teruo; Nakamura, Hitoshi; and Hashimoto, Masashi, 3,993,646.

Nakaishi, Curtis V.: *See—*
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Nakamura, Hitoshi: *See—*
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Nakamura, Itsuo: *See—*
Tuchida, Nobuo; Yamagata, Seiichi; Sakai, Masaaki; Nakamura, Itsuo; Kohara, Tadashi; Morishita, Syozo; and Kukino, Satoshi, 3,992,865.

Nakanishi, Takeshi: *See—*
Oda, Noriyuki; Yoshida, Takashi; Nakanishi, Takeshi; and Yoshikawa, Kensuke, 3,993,431.

Nakao, Masaru; Sasajima, Kikuo; Maruyama, Isamu; Katayama, Shigenari; and Yamamoto, Hisao, to Sumitomo Chemical Company, Limited. Phenoxyethylamine derivatives having central nervous system depressant and anti-hypertensive activity. 3,993,780, Cl. 424-330.000.

Nakao, Yukimichi: *See—*
Kobayashi, Katsumi; Dohgane, Iwao; and Nakao, Yukimichi, 3,993,696.

Nakaoka, Eiichi; Maekawa, Takeharu; Tokunaga, Masahide; and Morishima, Shozo, to Shimadzu Seisakusho Ltd. Apparatus for automatically detecting and eliminating flaws on slabs or billets. 3,992,826, Cl. 51-35.000.

Nakayama, Yasuharu: *See—*
Aihara, Tetsuo; Watanabe, Tadashi; Nakayama, Yasuharu; Yamashita, Yoshio; and Toyomoto, Isao, 3,993,612.

Nakazono, Ryuichi: *See—*
Chimura, Kazuya; Kaneko, Takashi; Takashima, Shunichi; Nakazono, Ryuichi; Kawashima, Masao; Ota, Hiroyuki; Tamura, Kenji; Kagawa, Kazunori; Shimada, Kazushi; Maeda, Toru; Anzai, Hisao; Takoi, Kenji; and Sakunaga, Kenichi, 3,993,834.

Nalepa, Philip J.; Emtage, Peter R.; and Miller, Robert C., to Westinghouse Electric Corporation. Composition for VO_2 incandescent lamp current inrush limiters. 3,993,603, Cl. 252-518.000.

Nambu, Shuya: *See—*
Miyamori, Yukio; Masaki, Kenji; and Nambu, Shuya, 3,992,879.

Napier, John M.: *See—*
Overholser, Lyle G.; Masters, David R.; and Napier, John M., 3,993,738.

Narayanan, Sundaram, to Bell Telephone Laboratories, Incorporated. Overcompensated feedforward method and apparatus using overdistorted main amplifiers. 3,993,961, Cl. 330-149.000.

Narr, Berthold: *See—*
Nickl, Josef; Muller, Erich; Narr, Berthold; Haarmann, Walter; Schroter, Wolfgang; and Kadatz, Rudolf, 3,993,683.

Narwid, Thomas Albert: *See—*
Uskokovic, Milan Radoje; Narwid, Thomas Albert; Iacobelli, Jerome Anthony; and Baggiolini, Enrico, 3,993,675.

National Research Development Corporation: *See—*
Freeman, Michael Alexander Reykers; and Tuke, Michael Anthony, 3,992,726.

Navsat Corporation: *See—*
Jackson, Homer E., 3,993,997.

Nazinin, Nikolai Andreevich; Ananiev, Leonid Semenovich; Roox, Ivar Kharaldovich; and Efimov, Viktor Mikhailovich. Shaft furnace for thermolytic distillation of hydrocarbon fuel. 3,993,546, Cl. 202-99.000.

Nederlandse Industrie voor Baggerwerktuigen Nivoba N.V.: *See—*
Holthuis, Johannes Jacobus, 3,993,565.

Neffgen, Bernd: *See—*
Brinkmann, Bernd; and Neffgen, Bernd, 3,993,708.

Neil, Ernest M., to Action Lure Company. Action lure. 3,992,800, Cl. 43-42.240.

Neitzel, Hans Walter, to Mannesmann Aktiengesellschaft. Storage system with adjustable interconnected crane towers. 3,993,202, Cl. 214-16.40A.

Nellen, Wilhelm; Fabian, Wolfgang; and Sevenich, Theodor, to Hoesch Werke Aktiengesellschaft. Device for cooling band coils in hot rolling strip mills. 3,993,086, Cl. 134-57.00R.

Nelson, Keith E.: *See—*
Lisenbee, Wayne F.; and Nelson, Keith E., 3,993,075.

Ness, Peter: *See—*
Kramer, Gunter; Ness, Peter; and von Dohren, Hans-Hermann, 3,993,504.

Neufeld, Alonzo J.; and Hopson, Hazel L. Invalid support device. 3,993,349, Cl. 297-6.000.

Neugebauer, Constantine A.: *See—*
Babcock, Guy L.; Bryant, Walter M.; Neugebauer, Constantine A.; and Burgess, James F., 3,993,411.

Neuhauser, Gerhard: *See—*
Knauf, Alfons; Knauf, Karl; Wirsching, Franz; Neuhauser, Gerhard; and Altenhofer, Herbert, 3,993,822.

Neuman, Charles H., to Chevron Research Company. Radioactive logging for determining oil saturation in a reservoir. 3,993,902, Cl. 250-258.000.

Neuman, Charles H., to Chevron Research Company. Low-cost but accurate radioactive logging for determining gas saturation in a reservoir. 3,993,903, Cl. 250-258.000.

Neuman, Charles H., to Chevron Research Company. Low-cost but accurate radioactive logging for determining water saturations in a reservoir. 3,993,904, Cl. 250-258.000.

Neville Chemical Company: *See—*
Laurito, James J., 3,993,626.

New Concepts, Inc.: *See—*
Still, Robert C., 3,993,092.

New England Log Homes, Inc.: *See—*
Vizziello, Vito M., 3,992,838.

New York Wire Mills Corporation: *See—*
Borodin, Daniel J.; and Tolliver, Wilbur E., 3,993,332.

Newman, Douglas A., to Columbia Ribbon and Carbon Manufacturing Co., Inc. Pressure-sensitive transfer element and process. 3,993,832, Cl. 428-307.000.

Newman, Gordon Arthur, to Stryker Corporation. Therapeutic lavage. 3,993,054, Cl. 128-66.000.

Nicholson, Donald A., to Lorusso, Anthony M. Pocket billiard training ball and method of teaching sighting when playing pocket billiard. 3,993,305, Cl. 273-2.000.

Nickl, Josef; Muller, Erich; Narr, Berthold; Haarmann, Walter; Schroter, Wolfgang; and Kadatz, Rudolf, to Boehringer Ingelheim GmbH. Biphenylyl derivatives. 3,993,683, Cl. 260-470.000.

Nicolinas, John. Adjustable headband. 3,992,720, Cl. 2-418.000.

Nieder, Rudolf, to Arbeitsgemeinschaft Versuchsreaktor Avr GmbH. Removal of tritium from gas-cooled nuclear reactors. 3,993,541, Cl. 176-37.000.

Nightingale, Douglas Daniel John, to Imperial Chemical Industries Limited. Plug valves. 3,993,099, Cl. 137-625.480.

Nilsson, Jan, to Allmanna Svenska Elektriska Aktiebolaget. Press for hydrostatic extrusion of tubes. 3,992,913, Cl. 72-60.000.

Nilsson, Sten: *See—*
Dahlman, Goran; and Nilsson, Sten, 3,992,837.

Nippon Cable System Inc.: *See—*
Baba, Masanao, 3,993,169.

Nippon Concrete Industries Co. Ltd.: *See—*
Mori, Takemitsu; Tsunoda, Toshio; Hasegawa, Shinzo; and Tanaka, Masao, 3,993,419.

Nippon Electric Company, Ltd.: *See—*
Yonezu, Hiroo, 3,993,964.

Nippon Gakki Seizo Kabushiki Kaisha: *See—*
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Chibana, Masanobu; and Futamase, Tsuyoshi, 3,992,971.
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Nippon Kogaku K.K.: *See—*
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Nippon Oil Seal Industry Co., Ltd.: *See—*
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Nippon Steel Corporation: *See—*
Miki, Takeshi; Tamano, Toshitaka; and Yokokawa, Takao, 3,992,974.

Nishida, Fusao: *See—*
Morikawa, Kiyoshi; Nishida, Fusao; Yamada, Tomiaki; Suzuki, Noriyuki; Takeda, Takehiko; Yanagihara, Tsutomu; Adachi, Katshiko; Asanabe, Tadashi; Ohsato, Katuaki; and Tsuda, Kintaro, 3,993,731.

Nishimura, Hiromi: *See—*
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Nishimura, Shinzi: *See—*
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Nissan Motor Co., Ltd.: *See—*
Miyamori, Yukio; Masaki, Kenji; and Nambu, Shuya, 3,992,879.
Mukai, Kosaburo; Shinzawa, Motohiro; and Yasuhara, Seishi, 3,993,037.
Okada, Yasuhiro; and Shirota, Kensho, 3,993,524.

Nitsch, Rainer: *See—*
Riedl, Rudi; Jungnickel, Regina; Nitsch, Rainer; Lein, Werner; Vetter, Lothar; Schone, Helmut; Weisbach, Gunter; Johne, Hans; Schott, Alfred; Forster, Karl-Heinz; and Johne, Albrecht, 3,993,303.

Noble, Peter M., to Westinghouse Air Brake Company. Coefficient of frictional determining apparatus for railway vehicles. 3,992,922, Cl. 73-9.000.

Noda, Taizo, to Kohshoh Limited. Clip. 3,992,758, Cl. 24-251.000.

Noguchi, Masaru; and Ooue, Shingo, to Fuji Photo Film Co., Ltd. Device for reconstructing color holographic image. 3,993,398, Cl. 350-3.500.

Noll, Barton B., to R. C. Sports, Inc. Laminar roller rink surface and method of producing same. 3,993,823, Cl. 428-213.000.

Nonn, Konrad: *See—*
Kruckenberg, Winfried; Nonn, Konrad; Pape, Georg; and Kressner, Michael, 3,993,619.

North American Philips Corporation: *See—*
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Northern Electric Company Limited: *See—*
Boctor, Stalin A., 3,993,959.

Norton Company: *See—*
Scott, John J., 3,993,119.

Novak, Richard A., to Advanced Product Engineering Corporation. Filtration apparatus. 3,993,564, Cl. 210-360.00A.

Novak, Richard Charles; and Pike, Roscoe Adams, to United Technologies Corporation. Resin bonded composite articles and process for fabrication thereof. 3,993,818, Cl. 428-114.000.

November, Milton H., to International Telephone and Telegraph Corporation. Apparatus for producing a mass flow rate signal with or without a density signal. 3,992,939, Cl. 73-194.00M.

Numabe, Hitomi, to Kabushiki Kaisha Suwa Seikosha. Chronograph wristwatch. 3,992,871, Cl. 58-39.500.

Nunziato, Benny; and Nunziato, Elizabeth, to Lawrence Peska Associates, Inc., a part interest. Boat docking pole for small boats. 3,993,013, Cl. 114-221.00R.

Nunziato, Elizabeth: *See—*
Nunziato, Benny; and Nunziato, Elizabeth, 3,993,013.

Nut Cutters, Inc.: *See—*
Perkins, Lee E.; Gray, Robert D.; and Parra, Ernest P., 3,992,777.

Nuzzi, Francis J.: *See—*
Polichette, Joseph; Leech, Edward J.; and Nuzzi, Francis J., 3,993,802.

Nyman, Tage, to AB Wet Talc. Powdered material parting agent. 3,993,494, Cl. 106-38.220.

O & K Orenstein & Koppel Aktiengesellschaft: *See—*
Weight, Armin; and Warnke, Heinz-Walter, 3,993,158.

Oakes, DuWayne E. Rod sections retaining socket & bracket. 3,992,799, Cl. 43-25.000.

Oakes, Thomas B. Adhesive tape dispenser. 3,993,230, Cl. 225-47.000.

Oberley, Gene; and Thompson, Richard D., to McGraw-Edison Company. Compression extractor device for laundry goods. 3,992,905, Cl. 68-241.000.

O'Brien, David, to Fairchild Camera and Instrument Corporation. Combined method for fabricating oxide-isolated vertical bipolar transistors and complementary oxide-isolated lateral bipolar transistors and the resulting structures. 3,993,513, Cl. 148-175.000.

O'Brien, William J.; and Sakal, John, to Standard Register Company, The. Direct mail advertising booklet and method of production. 3,993,299, Cl. 270-5.000.

Ochs, Charles S.; and Martin, James L., to Anchor Hocking Corporation. Container closure and manufacture. 3,993,210, Cl. 215-274.000.

Oda, Noriyuki; Yoshida, Takashi; Nakanishi, Takeshi; and Yoshikawa, Kensuke, to Hitachi Shipbuilding and Engineering Co., Ltd. Apparatus for generating high-pressure gas. 3,993,431, Cl. 431-190.000.

Oda, Walter S.: *See—*
Stevens, Ralph B.; and Oda, Walter S., 3,993,138.

Oediger, Hermann; and Braden, Rudolf, to Bayer Aktiengesellschaft. 3-Amidocoumaranones. 3,993,665, Cl. 260-343.30R.

Oediger, Hermann; and Braden, Rudolf, to Bayer Aktiengesellschaft. Coumaranedione-3-monoximes. 3,993,666, Cl. 260-343.30R.
Oettinger, John F., to Esco Corporation. Rotary feeder valve. 3,993,227, Cl. 222-368.000.
Off, Joseph W. A.; and Wilbanks, Darrel J., to Haggar Company. Method of and apparatus for making bonded belt loops. 3,993,526, Cl. 156-202.000.
Office National d'Etudes et de Recherches Aerospatiales (O.N.E.R.A.): *See—*
Meauze, Georges D.; Thibert, Jean-Jacques; and Leynaert, Jacky R., 3,993,414.
Oganesian, Oganes Vardanovich: *See—*
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Ogorzalek, Joseph F.: *See—*
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Ohe, Takao. Collapsible prefabricated house. 3,992,828, Cl. 52-69.000.
Ohira, Atsuo; and Kozaki, Tatsuo, to Aisin Seiki Kabushiki Kaisha. Stitch forming mechanism of a sewing machine. 3,993,007, Cl. 112-184.000.
Ohloff, Gunther: *See—*
Thomas, Alan Francis; and Ohloff, Gunther, 3,993,604.
Ohsato, Katuaki: *See—*
Morikawa, Kiyoshi; Nishida, Fusao; Yamada, Tomiaki; Suzuki, Noriyuki; Takeda, Takehiko; Yanagihara, Tsutomu; Adachi, Katshiko; Asanabe, Tadashi; Ohsato, Katuaki; and Tsuda, Kintaro, 3,993,731.
Ohta, Mitsuharu, to Nippon Gakki Seizo Kabushiki Kaisha. Method for producing ski or other curved articles with resilient mold. 3,993,527, Cl. 156-245.000..
Ohura, Kikuo: *See—*
Nakabayashi, Hirotomo; Ohura, Kikuo; Fujita, Nobuhito; Miyakawa, Shintaro; Saito, Tukasa; and Higuchi, Makoto, 3,993,787.
Oishi, Yasushi, to Fuji Photo Film Co., Ltd. Diffusion transfer color photographic flim unit with composite of image-receiving element with light intercepting element. 3,993,486, Cl. 96-29.00D.
Oishi, Yasushi, to Fuji Photo Film Co., Ltd. Photograhic film assembly comprising light intercepting elements located behind pressure plate. 3,993,488, Cl. 96-76.00C.
Okada, Yasuhiro; and Shirota, Kensho, to Nissan Motor Co., Ltd. Adhesive bonding method allowing nondestructive separation of bonded materials. 3,993,524, Cl. 156-155.000.
Okawa, Tadashi, to Dijet Industrial Co., Ltd. Cemented carbide material. 3,993,446, Cl. 29-182.700.
O'Keefe, David B.: *See—*
Cassarino, Frank V., Jr.; Barlow, George J.; Bekampis, George J.; Conway, John W.; Lemay, Richard A.; O'Keefe, David B.; Riikonen, Douglas L.; and Woods, William E., 3,993,981.
Oku, Teruo: *See—*
Kamiya, Takashi; Saito, Yoshihisa; Teraji, Tsutomu; Nakaguti, Osamu; Oku, Teruo; Nakamura, Hitoshi; and Hashimoto, Masashi, 3,993,646.
Olah, George A.; and Messina, Giuseppe, to Societa Italiana Resine S.I.R. S.p.A. Process for preparing supported superacid catalysts suitable for alkylation of aromatic hydrocarbons. 3,993,587, Cl. 252-429.00R.
O'Leary, Stephen H., to Ivac Corporation. Syringe pump drive system and disposable syringe cartridge. 3,993,061, Cl. 128-214.00F.
Olin Corporation: *See—*
Bhutani, Sudhir K., 3,993,693.
Cheskis, Harvey P.; and Shapiro, Stanley, 3,993,479.
Martin, R. Hugo; Owens, William F., Jr.; and McCarty, Stuart W., 3,993,082.
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Olsson, Alvar: *See—*
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Olsson, Jons Kurt Alvar: *See—*
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Maitani, Yoshihisa; Shimoyama, Kunio; Yoshida, Muneaki; Hashimoto, Akihiko; and Kitagawa, Masahiro, 3,994,001.
Sato, Masaaki, 3,993,920.
O'Neill, John Francis, to Bell Telephone Laboratories, Incorporated. Resistive battery feed for line circuits. 3,993,880, Cl. 179-170.00D.
Ono, Kenji; Nishimura, Hiromi; Mori, Tetsuo; and Sauer, Hans, to Matsushita Electric Works, Ltd.; and Sauer, Hans, part interest to each. Electromagnetic relay. 3,993,971, Cl. 335-202.000.
Onopchenko, Anatoli; and Schulz, Johann G. D., to Gulf Research & Development Company. Oxidation of alkanes. 3,993,676, Cl. 260-413.000.
Oono, Hideshi: *See—*
Tamaru, Munetaka; Kume, Kazunari; Watanabe, Minoru; Oono, Hideshi; and Sato, Hideo, 3,992,868.
Ooue, Shingo: *See—*
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Opavsky, Werner; and Macpherson, Elvira, to Wacker-Chemie GmbH. Process for eliminating reactive chlorinated organic compounds from aqueous solutions. 3,993,559, Cl. 210-54.000.
Optical Recognition Systems, Inc.: *See—*
Welch, Rolland; Springer, Robert; Mayberry, Brian; and Sheppard, Robert, 3,993,193.
O'Rear, Jacques G.: *See—*
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Orien, William P.; Root, Merton L.; and Weed, John H. Insole and outsole construction for athletic (tennis) shoes, and the like. 3,992,788, Cl. 36-91.000.
Orihara, Yasunori: *See—*
Tomioka, Masao; and Orihara, Yasunori, 3,994,015.
Orion Werke AG: *See—*
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Orke, Gustav Georg: *See—*
Imberg, Bengt Uno; Karlsson, Kurt Hakan; and Orke, Gustav Georg, 3,993,886.
Orndorff, Roy L., Jr., to B. F. Goodrich Company, The. Thin rubber surfaced bearings. 3,993,371, Cl. 308-238.000.
Orpana, Robert J., to Panatrac Manufacturing Corporation Ltd. Vehicle tracks. 3,993,366, Cl. 305-35.00R.
Orpana, Robert J., to Panatrac Manufacturing Corporation Limited. Guiding element for a vehicle track. 3,993,367, Cl. 305-36.000.
Orr, Francis D.: *See—*
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Orton, Tony William: *See—*
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Osaki, Tatsuo, to Yoshida Kogyo Kabushiki Kaisha. Presser foot sewing machines. 3,993,009, Cl. 112-235.000.
Osmond, M. Wayne. Torquing or speeding lug wrench. 3,992,964, Cl. 81-57.310.
Ostrowsky, Efrem M., to VCA Corporation. Safety closure means. 3,993,208, Cl. 215-216.000.
Ota, Hiroyuki: *See—*
Chimura, Kazuya; Kaneko, Takashi; Takashima, Shunichi; Nakazono, Ryuichi; Kawashima, Masao; Ota, Hiroyuki; Tamura, Kenji; Kagawa, Kazunori; Shimada, Kazushi; Maeda, Toru; Anzai, Hisao; Takoi, Kenji; and Sakunaga, Kenichi, 3,993,834.
Otto, Petrus Philippus Hermann Leonardus, to U.S. Philips Corporation. ^{75}Se and ^{125m}Te Compounds for fat resorption tests. 3,993,741, Cl. 424-1.000.
Oulton, T. Dixon: *See—*
Isaac, Peter A. H.; and Oulton, T. Dixon, 3,993,500.
Outboard Marine Corporation: *See—*
Rubin, Robert M., 3,992,859.
Ovation Instruments, Inc.: *See—*
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Reynolds, David L.; and Youngblood, Douglas J., to Texaco Inc. Method of catalytic cracking of hydrocarbons. 3,993,556, Cl. 208-75.000.
Rhee, Jhoon Goo. Protective helmet. 3,992,722, Cl. 2-424.000.
Rhodes, Eric Stanley. Apparatus for the treatment of textile fabrics. 3,992,746, Cl. 15-307.000.
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Robinson, Russell S. Resilient hitch for cycle trailer. 3,993,320, Cl. 280-204.000.
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Roza, Engel, to U.S. Philips Corporation. Transmission system for pulse signals of fixed clock frequency. 3,993,952, Cl. 325-13.000.

Rubel, Erich, to Robert Bosch G.m.b.H. Guidance system for guiding trackless vehicles along a path defined by an A-C energized conductor. 3,993,156, Cl. 180-98.000.

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Ryan, Allan F. Electrical outlet box. 3,993,212, Cl. 220-3.600.

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Schmall, Karl-Heinz, to Precitec Gesellschaft fur Prazisionstechnik und Electronik. Apparatus for equalizing the resistance value of an electrically conductive layer. 3,992,819, Cl. 51-8.00R.

Schmidgall, Heinz, to Chemiro AG. Apparatus for packaging and dispensing a stain removing agent in portions. 3,993,190, Cl. 206-229.000.

Schmidlin, Julius; and Biollaz, Michel, to Ciba-Geigy Corporation. Process for the manufacture of 11β,18-oxido-18,21-dihydroxy-20-oxopregnane compounds. 3,993,644, Cl. 260-239.55R.

Schmidt, Erwin; Clauss, Karl; Pietsch, Hartmut; and Jensen, Harald, to Hoechst Aktiengesellschaft. β-Acyloxy-crotonic acid amide-N-sulfohalides and a process for their preparation. 3,993,689, Cl. 260-490.000.

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Schnabel, Wilhelm J.; and Raes, Maurice C., to Olin Corporation. Polyurethane foam. 3,993,610, Cl. 260-2.5AT.

Schneider, Burnett M., to United States of America, Interior. Thin cell electromembrane separator. 3,993,517, Cl. 156-13.000.

Schneider, John M.; Hermanson, Herman A.; and Abreu, Christian O., to Xerox Corporation. Blade applicator assembly. 3,993,020, Cl. 118-407.000.

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Schober, Manfred; and Augstein, Wolfgang A., to Du Pont de Nemours, E. I., and Company. Direct positive photographic elements containing developers. 3,993,490, Cl. 96-95.000.

Scholz-Weigl, Sigrid; and von Praun, Ferdinand, to Chemische Werke Huls Aktiengesellschaft. Foam inhibited or attenuated washing, cleaning and rinsing agents for dishes and utensils. 3,993,605, Cl. 252-550.000.

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Schora, Frank C., Jr.; Matthews, Charles W.; and Knowlton, Ted M., to United States of America, Energy Research and Development Administration. Electrode assembly for a fluidized bed apparatus. 3,993,450, Cl. 23-284.000.

Schott, Alfred: *See—*
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Schreiner, Horst; and Hassler, Heinrich, to Siemens Aktiengesellschaft. Contact material for high-power vacuum circuit breakers. 3,993,481, Cl. 75-170.000.

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Schudy, Karl-Heinz; and Kleinert, Heinz, to Robert Krause KG. Filling device for papers. 3,993,374, Cl. 312-184.000.

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Schultz, Frederick E., to General Electric Company. Orthogonally woven reinforcing structure. 3,993,817, Cl. 428-64.000.

Schulz, Johann G. D.: *See—*
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Schulz, Wallace W., to United States of America, Energy Research and Development Administration. Bidentate organophosphorus solvent extraction process for actinide recovery and partition. 3,993,728, Cl. 423-9.000.

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Schwartz, Norman L., to Multiplex Communications, Inc. Time multiplex system with separate data, sync and supervision busses. 3,993,870, Cl. 179-15.0BS.

Schwarz, Heinz; Decker, Heinz; and Strobl, Hans, to Karl M. Reich Maschinenfabrik. Arrangement for producing fastener strips for pneumatic nail drivers and the like. 3,992,852, Cl. 53-196.000.

Schwarz, Walter. Electrically insulating pipe coupling. 3,993,331, Cl. 285-53.000.

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Scott, John J., to Norton Company. Progressively or continuously cycled mold for forming and discharging a fine crystalline material. 3,993,119, Cl. 164-330.000.

Scott Paper Company: *See—*
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Scott, Robert A. Irrigation gravel guard and clean-out means therefor. 3,992,886, Cl. 61-12.000.

Scott, Stanley Harold. Tennis target structure. 3,993,306, Cl. 273-29.00A.

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Searle Cardio-Pulmonary Systems Inc.: *See—*
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Searle, Robert J. G.; and Woodall, Roger E., to Shell Oil Company. Pesticidal cyclopropane derivatives. 3,993,774, Cl. 424-305.000.

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Seger, Leif Sven, to A. Ahlstrom Osakeyhtio; and Oy Nokia AB. Current collector, provided with a selector, for a conductor rail. 3,993,385, Cl. 339-21.00R.

Seglin, Leonard, to COGAS Development Company. Gasification of ash containing carbonaceous solids. 3,993,583, Cl. 252-373.000.

Sehgal, Surendra N.; Blazekovic, Teodora M.; and Vezina, Claude, to Ayerst McKenna and Harrison Ltd. Rapamycin and process of preparation. 3,993,749, Cl. 424-122.000.

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Sendyk, Andrzej M.; and Johnson, Dennis W., to Sed Systems Ltd. Automatic dialing equipment. 3,993,877, Cl. 179-90.00B.

Senese, Dominick J. Lobster trap. 3,992,804, Cl. 43-100.000.

Senour, Donald A., to Bofors America, Inc. Overload signalling system for fork lift trucks and the like. 3,993,166, Cl. 187-9.00R.
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Silverman, Daniel; and Bailey, John R., to Senturion Sciences, Inc. Seismic method for determining the position of the bit on a drill stem in a deep borehole. 3,993,974, Cl. 340-15.5MC.
Simmons, Alden C.; McFadden, James T.; and Bennett, Robert S., to Whittaker Corporation. Wheelchair-mounted control apparatus. 3,993,154, Cl. 180-77.00R.
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Smolinski, Manfred: *See—*
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Stansell, Stanley M., to Xerox Corporation. Filament wound ink applicator roll. 3,993,024, Cl. 118-661.000.

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Stelzer, Raymond F., to Wagner Electric Corporation. Pressure protection valve and system. 3,993,361, Cl. 303-64.000.

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Stevens, Daryl A.; and Wicktor, Russell D. Water safety device. 3,992,739, Cl. 9-14.000.

Stevens, Edward C. Locking device having an integral alarm system. 3,993,987, Cl. 340-274.00R.

Stevens, Ralph B.; and Oda, Walter S., to United States of America, Interior. Fire prevention system. 3,993,138, Cl. 169-61.000.

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Stolzer, Claus; Behrenz, Wolfgang; and Hammann, Ingeborg, to Bayer Aktiengesellschaft. S-(alkoxycarbonyl)-alkyl-thiophosphoric acid ester amides. 3,993,717, Cl. 260-942.000.

Storms, James G., to J. E. Love Company. Tree seedling harvester. 3,993,142, Cl. 171-101.000.

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Strandli, Kare Roald, to A/S Raufoss Ammunisjonsfabrikker. Projectile with delayed bursting effect. 3,992,996, Cl. 102-56.00R.

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Stucky, Fritz Christoph, to Credelca A.G. Buildings. 3,992,848, Cl. 52-745.000.

Sturdivant, Jack E. Anterior cotton roll holder. 3,992,781, Cl. 32-35.000.

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Stutz, Robert E., to Koppers Company, Inc. Wood preservative containing alkali metal cyanides. 3,993,752, Cl. 424-129.000.

Suburban Metal Industries, Ltd.: *See—*
Reed, Wesley Bram, 3,993,167.

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Sugai, Tetuya. Electric communication system. 3,993,954, Cl. 325-43.000.

Suggitt, Robert M.; and Gates, Walter C., Jr., to Texaco Inc. Method of producing n-paraffin oximes. 3,993,554, Cl. 204-162.0XN.

Sugimoto, Toshiaki: *See—*
Takiyama, Eiichiro; Sugimoto, Toshiaki; and Hanyuda, Toshiaki, 3,993,663.

Sulzer Brothers Limited: *See—*
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Sumitomo Chemical Company, Limited: *See—*
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Kobayashi, Katsumi; Dohgane, Iwao; and Nakao, Yukimichi, 3,993,696.
Nakao, Masaru; Sasajima, Kikuo; Maruyama, Isamu; Katayama, Shigenari; and Yamamoto, Hisao, 3,993,780.
Tsuji, Kozo; Toyota, Nobuhiro; and Fujita, Fumio, 3,993,840.
Uematsu, Tamon; Tanaka, Katsutoshi; and Sanemitsu, Yuzuru, 3,993,771.

Summers, Thomas Wade. Pivotable bumper for carrying motorcycles. 3,993,229, Cl. 224-42.03B.

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Jomen, Katsumasa; and Sunaga, Keitaro, 3,993,206.

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Surface Technology, Inc.: *See—*
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Suter, Rolf, to Schenker Maschinen AG. Grinding machine including means to supply coolant to the work area. 3,992,820, Cl. 51-118.000.

Sutton, William H. Apparatus for collecting and disposing of refuse. 3,992,986, Cl. 100-7.000.

Suvorov, Boris Viktorovich; Sembaev, Dauren Khamitovich; Kolodina, Ivetta Sergeevna; and Stepanova, Lidia Anatolievna. Method of obtaining aromatic tri-or-tetracarboxylic acids. 3,993,690, Cl. 260-524.00R.

Suzuki, Masuo; and Takatsu, Suehiro, to Kabushiki Kaisha Takatsu Seisakusho. Energy storing device. 3,993,295, Cl. 267-152.000.

Suzuki, Noriyuki: *See—*
Morikawa, Kiyoshi; Nishida, Fusao; Yamada, Tomiaki; Suzuki, Noriyuki; Takeda, Takehiko; Yanagihara, Tsutomu; Adachi, Katshiko; Asanabe, Tadashi; Ohsato, Katuaki; and Tsuda, Kintaro, 3,993,731.

Svenstam, Sven Gunnar, to Granges Essem Aktiebolag. Steps, stairs and the like. 3,993,122, Cl. 165-45.000.

Svoboda, Dipl.-Ing. Josef: *See—*
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Swain, Allan L.: *See—*
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Swearingen, Edward J. Fuel filter. 3,993,561, Cl. 210-131.000.

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Sweeny, Norman P.; and Thom, Karl Friedrich, to Minnesota Mining and Manufacturing Company. Stabilized alpha-cyanoacrylate compositions. 3,993,678, Cl. 260-465.00D.

Swesco Inc.: *See—*
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Swystun, Alexander Gregory: *See—*
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Sygall, Peter Ivan: *See—*
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Sygnator, Henry Anton, to Illinois Tool Works Inc. Screw blank receiving and orienting collet. 3,992,740, Cl. 10-2.000.

Syntex (U.S.A.) Inc.: *See—*
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Beard, Colin C.; Edwards, John A.; and Fried, John H., 3,993,769.
Beigler, Myron A.; and Amen, Ronald J., 3,993,746.
Pfister, Jurg R., 3,993,669.

Szabo, Anthony W.; and Del Guercio, Louis R. M. Fluid infusion apparatus. 3,993,065, Cl. 128-218.00A.

'T Veld, Jan Man in: *See—*
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Tabata, Toshikazu: *See—*
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Takahashi, Katsumasa: *See—*
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Takamatsu, Ikuo. Apparatus for the manufacture of continuous coupling elements for slide fasteners. 3,993,724, Cl. 264-138.000.

Takashima, Shunichi: *See—*
Chimura, Kazuya; Kaneko, Takashi; Takashima, Shunichi; Nakazono, Ryuichi; Kawashima, Masao; Ota, Hiroyuki; Tamura, Kenji; Kagawa, Kazunori; Shimada, Kazushi; Maeda, Toru; Anzai, Hisao; Takoi, Kenji; and Sakunaga, Kenichi, 3,993,834.

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Takiyama, Eiichiro; Sugimoto, Toshiaki; and Hanyuda, Toshiaki, to Showa High Polymer Co., Ltd. Curable resinous composition. 3,993,663, Cl. 260-340.700.

Takoi, Kenji: *See—*
Chimura, Kazuya; Kaneko, Takashi; Takashima, Shunichi; Nakazono, Ryuichi; Kawashima, Masao; Ota, Hiroyuki; Tamura, Kenji; Kagawa, Kazunori; Shimada, Kazushi; Maeda, Toru; Anzai, Hisao; Takoi, Kenji; and Sakunaga, Kenichi, 3,993,834.

Tallent, Michael W.; Scaggs, Lee E.; Swain, Allan L.; Harrison, Ronnie M.; and Hendershot, William B., III, to Consolidated Video Systems, Inc. Sequence control unit for a television time base corrector. 3,993,982, Cl. 340-173.00R.

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Tamaru, Munetaka; Kume, Kazunari; Watanabe, Minoru; Oono, Hideshi; and Sato, Hideo, to Citizen Watch Co., Ltd. Timepiece with calendar mechanism. 3,992,868, Cl. 58-5.000.

Tamura, Kenji: *See—*
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Tanaka, Shigetoshi: *See—*
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Taniuchi, Keiji. Process and apparatus for forming rearably detachable portion on sheet. 3,993,010, Cl. 113-121.00C.

Tann, Walter. Line tensioning device. 3,993,197, Cl. 211-119.090.

Tantlinger, Keith W., to Rohr Industries, Inc. Compound filled key interlock joint. 3,992,846, Cl. 52-588.000.

Tarzia, Giorgio; and Panzone, Gianbattista, to Gruppo Lepetit S.p.A. Pyrrolo [3,4-d] pyrimidines. 3,993,650, Cl. 260-256.40F.

Taubmann, Harro J.: *See—*
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Taylor, Charles, to Delanair Limited. Heat exchanger. 3,993,126, Cl. 165-173.000.

Taylor, Don A. Heating system. 3,993,244, Cl. 237-53.000.

Taylor Industries, Inc.: *See—*
Taylor, Philip W., 3,993,395.

Taylor, Lloyd D.: *See—*
Grasshoff, J. Michael; and Taylor, Lloyd D., 3,993,661.

Taylor, Philip W., to Taylor Industries, Inc. Modular snap-together fuse block assembly. 3,993,395, Cl. 339-198.00H.

Technofil S.p.A.: *See—*
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Tee-Pak Inc.: *See—*
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Teleflex Morse Ltd.: *See—*
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Telefonaktiebolaget L M Ericsson: *See—*
Davila, Octaviano Aguirre; and Hellstrom, Lennart Johan Yngve Johansson, 3,993,531.
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Temco Products, Inc.: *See—*
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Tempka, John Anthony: *See—*
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Texas Iron Works, Inc.: *See—*
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Textron, Inc.: *See—*
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Thackery, Russell H. Log splitting apparatus. 3,993,113, Cl. 144-194.000.

Thai, Nguyen: *See—*
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Theidel, Hans: *See—*
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Thiemann, Wolfram; and Heide, Erich A., to Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung. Pipetting device. 3,992,947, Cl. 73-421.00R.

Thiokol Corporation: *See—*
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Thom, Karl Friedrich: *See—*
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Thomas, Alan Francis; and Ohloff, Gunther, to Firmenich S.A. Alicyclic compounds, their use and process for preparing same. 3,993,604, Cl. 252-522.000.

Thomas & Betts Corporation: *See—*
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Thomas, Morton I., to Temco Products, Inc. Folding walker. 3,993,088, Cl. 135-67.000.

Thompson, Hugh L.; and Wendlend, George A. Variable pattern screen printer. 3,992,989, Cl. 101-112.000.

Thompson, Larry W.: *See—*
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Thoms, Robert L. Measuring the strength of a rock formation in situ. 3,992,928, Cl. 73-88.00E.

Thomson-CSF: *See—*
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Tiemann, Eckhard; Reischl, Artur; Konig, Klaus; and Hetzel, Hartmut, to Bayer Aktiengesellschaft. Process for the production of polyisocyanates containing uretdione groups. 3,993,641, Cl. 260-239.00A.

Tillotson, Richard. Jig-saw puzzle educational game device. 3,993,313, Cl. 273-130.0AC.

Timmerman, Daniel Maurice; and De Winter, Walter Frans, to AGFA-GEVAERT N.V. Recording material. 3,993,850, Cl. 428-474.000.

Tippetts, Thomas B.; and Chapin, Donald W., to Garrett Corporation, The. Tristable fluidic device. 3,993,101, Cl. 137-831.000.

Tischler, Wald E. Internal combustion engine. 3,993,036, Cl. 123-190.00A.

Tkachenko, Jury Alexandrovich. Double reduction tandem axle driving unit. 3,993,155, Cl. 180-88.000.

Toa Nenryo Kogyo Kabushiki Kaisha: *See—*
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Tomioka, Masao; and Orihara, Yasunori, to Sony Corporation. Overload protection circuit for tape recording and/or reproducing apparatus. 3,994,015, Cl. 360-85.000.

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Tonn, Erwin W. Fluid seal piston and cylinder assembly for a disc brake. 3,993,171, Cl. 188-72.400.

Toray Industries, Inc.: *See—*
Kurihara, Masaru; Ikeda, Kojuro; Dokoshi, Noriaki; and Kobayashi, Akio, 3,993,625.
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Torres, Antonia. Guide for trimming hair. 3,993,083, Cl. 132-45.00R.

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Toyota, Nobuhiro: *See—*
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Trainor, John W.; and Meltzer, David W., to Xerox Corporation. Device for electrostatographic reproduction of an optical image using a charge storage grid. 3,994,000, Cl. 346-160.000.
Tranquilla, Michael Nicholas; and Desai, Prakash Dhirubhai, to Union Special Corporation. Bearing transducer assembly. 3,992,931, Cl. 73-133.00R.
Transcodan Sven Husted-Andersen: *See—*
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Treiber, Fritz F., to Hobart Corporation. Steam pressure cooker with manually operable pressure venting. 3,992,984, Cl. 99-330.000.
Troeh, Frederick R., to Iowa State University Research Foundation, Inc. Soil movement detection apparatus. 3,992,927, Cl. 73-88.00E.
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Uchidoi, Masanori: *See—*
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Uchio, Ryosuke; Kikuchi, Kenji; Enei, Hitoshi; and Hirose, Yoshio, to Ajinomoto Co., Inc. Process for producing pyruvic acid by fermentation. 3,993,543, Cl. 195-29.000.
Uchiyama, Takashi; Ito, Tadashi; and Matsuda, Mutsuhide, to Canon Kabushiki Kaisha. Automatic flash photography apparatus. 3,994,007, Cl. 354-267.000.
Ueberschaer, Armin; Heubner, Ulrich; and Reinert, Max, to Metallgesellschaft Aktiengesellschaft. Lead-antimony alloy. 3,993,480, Cl. 75-166.00C.
Uematsu, Tamon; Tanaka, Katsutoshi; and Sanemitsu, Yuzuru, to Sumitomo Chemical Company, Limited. α-Benzylidene lactone derivatives. 3,993,771, Cl. 424-279.000.
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CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 78,315	3,982,192	Feb. 10, 1976	Sep. 21, 1976
B 79,099	3,982,177	Jan. 13, 1976	Sep. 21, 1976
B 150,142	3,981,767	Jan. 27, 1976	Sep. 21, 1976
B 160,045	3,983,446	Jan. 13, 1976	Sep. 28, 1976
B 160,099	3,987,221	Jan. 13, 1976	Oct. 19, 1976
B 163,463	3,981,659	Jan. 27, 1976	Sep. 21, 1976
B 200,759	3,986,872	Feb. 3, 1976	Oct. 19, 1976
B 208,916	3,987,106	Jan. 13, 1976	Oct. 19, 1976
B 223,678	3,989,159	Mar. 9, 1976	Nov. 2, 1976
B 248,240	3,983,556	Jan. 13, 1976	Sep. 28, 1976
B 270,274	3,982,223	Feb. 17, 1976	Sep. 21, 1976
B 276,026	3,992,405	Feb. 3, 1976	Nov. 16, 1976
B 279,969	3,986,073	Jan. 13, 1976	Oct. 12, 1976
B 301,143	3,991,107	Jan. 27, 1976	Nov. 9, 1976
B 302,160	3,985,774	Feb. 3, 1976	Oct. 12, 1976
B 306,668	3,985,713	Feb. 3, 1976	Oct. 12, 1976
B 307,698	3,993,763	Feb. 3, 1976	Nov. 23, 1976
B 308,659	3,981,947	Jan. 27, 1976	Sep. 21, 1976
B 311,450	3,988,976	Mar. 9, 1976	Nov. 2, 1976
B 326,211	3,988,272	Mar. 23, 1976	Oct. 26, 1976
B 333,110	3,989,867	Mar. 16, 1976	Nov. 2, 1976
B 336,754	3,989,805	Mar. 16, 1976	Nov. 2, 1976
B 339,194	3,982,215	Feb. 3, 1976	Sep. 21, 1976
B 348,433	3,984,405	Feb. 3, 1976	Oct. 5, 1976
B 349,370	3,989,684	Jan. 27, 1976	Nov. 2, 1976
B 356,187	3,981,222	Jan. 20, 1976	Sep. 21, 1976
B 358,260	3,989,661	Mar. 30, 1976	Nov. 2, 1976
B 358,427	3,989,896	Feb. 3, 1976	Nov. 2, 1976
B 359,901	3,981,729	Jan. 13, 1976	Sep. 21, 1976
B 367,621	3,989,589	Feb. 3, 1976	Nov. 2, 1976
B 369,221	3,985,834	Feb. 24, 1976	Oct. 12, 1976
B 370,309	3,989,640	Jan. 20, 1976	Nov. 2, 1976
B 372,016	3,989,685	Mar. 9, 1976	Nov. 2, 1976
B 373,354	3,989,870	Jan. 27, 1976	Nov. 2, 1976
B 374,588	3,985,899	Jan. 27, 1976	Oct. 12, 1976
B 378,513	3,981,750	Jan. 27, 1976	Sep. 21, 1976
B 379,177	3,981,976	Jan. 27, 1976	Sep. 21, 1976
B 381,709	3,984,587	Jan. 13, 1976	Oct. 5, 1976
B 381,985	3,990,775	Feb. 3, 1976	Nov. 9, 1976
B 384,330	3,985,613	Jan. 27, 1976	Oct. 12, 1976
B 384,654	3,992,681	Feb. 24, 1976	Nov. 16, 1976
B 385,483	3,993,684	Feb. 17, 1976	Nov. 23, 1976
B 385,631	3,982,924	Jan. 27, 1976	Sep. 28, 1976
B 386,257	3,981,915	Feb. 3, 1976	Sep. 21, 1976
B 386,673	3,993,717	Feb. 3, 1976	Nov. 23, 1976
B 386,828	3,992,440	Feb. 3, 1976	Nov. 16, 1976
B 389,304	3,986,829	Jan. 27, 1976	Oct. 19, 1976
B 390,031	3,985,799	Jan. 13, 1976	Oct. 12, 1976
B 390,408	3,992,426	Feb. 3, 1976	Nov. 16, 1976
B 391,473	3,988,370	Mar. 2, 1976	Oct. 26, 1976
B 391,797	3,988,046	Mar. 9, 1976	Oct. 26, 1976
B 394,248	3,989,764	Jan. 27, 1976	Nov. 2, 1976
B 394,350	3,982,200	Jan. 13, 1976	Sep. 21, 1976
B 396,164	3,989,590	Feb. 3, 1976	Nov. 2, 1976
B 398,220	3,990,834	Feb. 3, 1976	Nov. 9, 1976
B 398,488	3,987,991	Feb. 24, 1976	Oct. 26, 1976
B 399,908	3,983,323	Jan. 13, 1976	Sep. 28, 1976
B 400,871	3,988,893	Feb. 17, 1976	Nov. 2, 1976
B 401,042	D 242,197	Mar. 16, 1976	Nov. 9, 1976
B 402,553	3,983,219	Feb. 17, 1976	Sep. 28, 1976
B 402,929	3,991,251	Feb. 3, 1976	Nov. 9, 1976
B 403,507	3,982,095	Feb. 10, 1976	Sep. 21, 1976
B 405,726	3,981,241	Jan. 13, 1976	Sep. 21, 1976
B 407,737	3,992,546	Feb. 3, 1976	Nov. 16, 1976
B 409,848	3,983,270	Jan. 27, 1976	Sep. 28, 1976
B 411,471	3,982,933	Feb. 17, 1976	Sep. 28, 1976
B 411,765	3,993,428	Feb. 24, 1976	Nov. 23, 1976
B 412,068	3,981,244	Jan. 13, 1976	Sep. 21, 1976
B 414,028	3,993,738	Feb. 17, 1976	Nov. 23, 1976
B 414,266	3,993,614	Feb. 10, 1976	Nov. 23, 1976
B 414,481	3,982,979	Jan. 20, 1976	Sep. 28, 1976
B 414,971	D 242,208	Feb. 10, 1976	Nov. 9, 1976
B 416,589	3,990,363	Jan. 27, 1976	Nov. 9, 1976
B 417,014	3,981,851	Jan. 13, 1976	Sep. 21, 1976
B 417,349	3,985,076	Mar. 9, 1976	Oct. 12, 1976
B 418,489	3,989,592	Jan. 13, 1976	Nov. 2, 1976
B 419,582	3,989,681	Mar. 2, 1976	Nov. 2, 1976
B 420,321	3,990,645	Mar. 30, 1976	Nov. 9, 1976
B 420,472	3,993,934	Feb. 24, 1976	Nov. 23, 1976
B 423,404	3,990,958	Mar. 2, 1976	Nov. 9, 1976
B 423,867	3,990,844	Feb. 3, 1976	Nov. 9, 1976
B 423,883	3,986,871	Jan. 27, 1976	Oct. 19, 1976
B 424,354	D 242,416	Feb. 10, 1976	Nov. 23, 1976
B 424,989	3,990,569	Feb. 3, 1976	Nov. 9, 1976
B 425,588	3,985,111	Jan. 13, 1976	Oct. 12, 1976
B 426,424	3,993,742	Feb. 3, 1976	Nov. 23, 1976
B 426,639	3,992,539	Feb. 3, 1976	Nov. 16, 1976
B 427,883	3,982,277	Jan. 20, 1976	Sep. 21, 1976
B 428,271	3,987,415	Mar. 23, 1976	Oct. 19, 1976
B 428,877	3,984,649	Jan. 27, 1976	Oct. 5, 1976
B 429,018	3,990,061	Feb. 10, 1976	Nov. 2, 1976
B 429,157	3,990,628	Jan. 27, 1976	Nov. 9, 1976
B 429,434	3,989,223	Feb. 17, 1976	Nov. 2, 1976
B 430,157	3,992,465	Feb. 17, 1976	Nov. 16, 1976
B 430,172	3,982,563	Jan. 13, 1976	Sep. 28, 1976
B 430,276	3,982,171	Jan. 20, 1976	Sep. 21, 1976
B 430,287	D 242,489	Feb. 10, 1976	Nov. 23, 1976
B 430,334	3,981,677	Jan. 27, 1976	Sep. 21, 1976
B 431,072	3,985,610	Jan. 20, 1976	Oct. 12, 1976
B 431,334	3,988,095	Mar. 16, 1976	Oct. 26, 1976
B 432,991	3,991,669	Mar. 2, 1976	Nov. 16, 1976
B 433,094	3,987,768	Jan. 27, 1976	Oct. 26, 1976
B 436,724	3,991,856	Feb. 24, 1976	Nov. 16, 1976
B 437,559	3,993,287	Feb. 3, 1976	Nov. 23, 1976
B 437,596	3,985,638	Jan. 27, 1976	Oct. 12, 1976
B 438,484	3,992,451	Feb. 17, 1976	Nov. 16, 1976
B 438,882	3,983,719	Feb. 24, 1976	Oct. 5, 1976
B 438,916	3,983,050	Jan. 13, 1976	Sep. 28, 1976
B 439,542	3,982,199	Jan. 27, 1976	Sep. 21, 1976
B 440,858	3,993,670	Feb. 3, 1976	Nov. 23, 1976
B 441,723	3,988,249	Mar. 16, 1976	Oct. 26, 1976
B 442,163	D 242,192	Mar. 16, 1976	Nov. 9, 1976
B 442,866	3,982,351	Feb. 24, 1976	Sep. 28, 1976
B 442,970	3,989,890	Feb. 3, 1976	Nov. 2, 1976
B 443,163	3,981,242	Feb. 3, 1976	Sep. 21, 1976
B 443,446	D 242,494	Apr. 6, 1976	Nov. 23, 1976
B 443,647	3,990,737	Feb. 17, 1976	Nov. 9, 1976
B 443,712	3,982,233	Jan. 27, 1976	Sep. 21, 1976
B 445,459	3,988,889	Feb. 3, 1976	Nov. 2, 1976
B 447,000	3,984,419	Feb. 3, 1976	Oct. 5, 1976
B 447,440	3,991,724	Feb. 17, 1976	Nov. 16, 1976
B 450,521	3,982,838	Feb. 17, 1976	Sep. 28, 1976
B 450,701	3,991,084	Mar. 16, 1976	Nov. 9, 1976
B 450,708	3,989,724	Mar. 9, 1976	Nov. 2, 1976
B 450,967	3,983,055	Jan. 13, 1976	Sep. 28, 1976
B 451,308	3,991,037	Feb. 17, 1976	Nov. 9, 1976
B 451,534	3,986,033	Jan. 13, 1976	Oct. 12, 1976
B 452,672	3,981,602	Jan. 13, 1976	Sep. 21, 1976
B 452,883	3,981,735	Jan. 27, 1976	Sep. 21, 1976
B 453,616	3,987,376	Jan. 27, 1976	Oct. 19, 1976
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B 455,481	3,991,092	Feb. 24, 1976	Nov. 9, 1976
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B 456,148	3,984,269	Jan. 13, 1976	Oct. 5, 1976
B 456,579	3,993,715	Feb. 10, 1976	Nov. 23, 1976
B 457,850	3,993,586	Feb. 10, 1976	Nov. 23, 1976
B 457,862	3,987,195	Jan. 27, 1976	Oct. 19, 1976
B 457,886	3,988,498	Jan. 13, 1976	Oct. 26, 1976
B 458,617	3,984,422	Feb. 3, 1976	Oct. 5, 1976
B 459,811	3,982,173	Jan. 20, 1976	Sep. 21, 1976
B 460,388	3,989,448	Jan. 27, 1976	Nov. 2, 1976
B 460,441	3,981,828	Jan. 13, 1976	Sep. 21, 1976
B 460,846	3,985,817	Feb. 24, 1976	Oct. 12, 1976
B 461,184	3,992,482	Feb. 17, 1976	Nov. 16, 1976
B 461,336	3,982,231	Feb. 3, 1976	Sep. 21, 1976
B 461,352	3,981,681	Jan. 13, 1976	Sep. 21, 1976
B 461,874	3,982,276	Jan. 27, 1976	Sep. 21, 1976
B 462,386	3,988,188	Jan. 13, 1976	Oct. 26, 1976
B 462,424	3,989,602	Feb. 24, 1976	Nov. 2, 1976
B 462,893	3,984,253	Feb. 24, 1976	Oct. 5, 1976
B 463,322	3,989,982	Jan. 20, 1976	Nov. 2, 1976
B 463,388	3,992,605	Feb. 10, 1976	Nov. 16, 1976
B 463,671	3,985,385	Jan. 13, 1976	Oct. 12, 1976
B 464,290	3,990,307	Feb. 3, 1976	Nov. 9, 1976
B 464,587	3,991,091	Feb. 3, 1976	Nov. 9, 1976
B 465,145	3,981,148	Jan. 27, 1976	Sep. 21, 1976
B 465,202	3,989,757	Feb. 24, 1976	Nov. 2, 1976
B 465,393	3,987,390	Jan. 27, 1976	Oct. 19, 1976
B 465,688	3,989,770	Jan. 27, 1976	Nov. 2, 1976
B 466,390	3,983,349	Feb. 24, 1976	Sep. 28, 1976
B 466,444	3,986,039	Jan. 20, 1976	Oct. 12, 1976
B 466,906	3,993,037	Mar. 16, 1976	Nov. 23, 1976
B 466,929	3,991,195	Jan. 27, 1976	Nov. 9, 1976
B 467,412	3,981,265	Jan. 13, 1976	Sep. 21, 1976
B 467,486	3,991,725	Mar. 16, 1976	Nov. 16, 1976
B 467,971	3,983,453	Jan. 13, 1976	Sep. 28, 1976
B 468,052	3,988,335	Feb. 10, 1976	Oct. 26, 1976
B 468,350	3,981,922	Jan. 13, 1976	Sep. 21, 1976
B 469,947	3,984,153	Jan. 20, 1976	Oct. 5, 1976
B 470,170	3,986,410	Jan. 13, 1976	Oct. 19, 1976
B 470,348	3,981,929	Jan. 13, 1976	Sep. 21, 1976
B 470,601	3,985,655	Mar. 9, 1976	Oct. 12, 1976
B 470,798	3,987,480	Jan. 20, 1976	Oct. 19, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 471,221	3,981,974	Jan. 13, 1976	Sep. 21, 1976
B 471,405	3,993,576	Feb. 10, 1976	Nov. 23, 1976
B 471,494	3,993,660	Mar. 16, 1976	Nov. 23, 1976
B 471,579	3,985,689	Jan. 13, 1976	Oct. 12, 1976
B 471,735	3,989,408	Feb. 3, 1976	Nov. 2, 1976
B 472,241	3,992,453	Feb. 17, 1976	Nov. 16, 1976
B 472,256	3,985,789	Jan. 13, 1976	Oct. 12, 1976
B 472,284	3,982,078	Jan. 13, 1976	Sep. 21, 1976
B 473,039	3,985,747	Feb. 10, 1976	Oct. 12, 1976
B 473,040	3,985,738	Feb. 10, 1976	Oct. 12, 1976
B 473,813	3,989,071	Mar. 9, 1976	Nov. 2, 1976
B 473,972	3,984,043	Jan. 13, 1976	Oct. 5, 1976
B 474,573	3,988,375	Jan. 20, 1976	Oct. 26, 1976
B 475,236	3,989,990	Feb. 3, 1976	Nov. 2, 1976
B 475,681	3,983,332	Jan. 20, 1976	Sep. 28, 1976
B 476,372	3,985,771	Feb. 24, 1976	Oct. 12, 1976
B 476,577	3,982,070	Jan. 20, 1976	Sep. 21, 1976
B 476,681	3,986,181	Jan. 13, 1976	Oct. 12, 1976
B 477,252	3,985,759	Jan. 13, 1976	Oct. 12, 1976
B 477,481	3,991,076	Feb. 3, 1976	Nov. 9, 1976
B 477,597	3,993,912	Feb. 17, 1976	Nov. 23, 1976
B 478,739	3,992,253	Feb. 17, 1976	Nov. 16, 1976
B 479,175	3,985,700	Feb. 17, 1976	Oct. 12, 1976
B 479,242	3,983,074	Feb. 17, 1976	Sep. 28, 1976
B 480,292	3,994,011	Mar. 16, 1976	Nov. 23, 1976
B 480,604	3,985,251	Jan. 13, 1976	Oct. 12, 1976
B 480,662	3,988,382	Mar. 2, 1976	Oct. 26, 1976
B 481,600	3,981,235	Jan. 27, 1976	Sep. 21, 1976
B 481,737	3,982,057	Jan. 13, 1976	Sep. 21, 1976
B 481,930	3,992,717	Feb. 24, 1976	Nov. 16, 1976
B 482,709	3,985,733	Feb. 24, 1976	Oct. 12, 1976
B 482,907	3,984,811	Jan. 20, 1976	Oct. 5, 1976
B 483,256	3,981,723	Feb. 10, 1976	Sep. 21, 1976
B 483,606	3,986,990	Jan. 27, 1976	Oct. 19, 1976
B 483,615	3,988,637	Jan. 27, 1976	Oct. 26, 1976
B 483,762	3,993,608	Feb. 10, 1976	Nov. 23, 1976
B 483,865	3,985,693	Jan. 13, 1976	Oct. 12, 1976
B 484,029	3,983,558	Feb. 10, 1976	Sep. 28, 1976
B 484,067	3,992,374	Feb. 17, 1976	Nov. 16, 1976
B 484,332	3,986,540	Mar. 2, 1976	Oct. 19, 1976
B 484,365	3,983,578	Jan. 27, 1976	Sep. 28, 1976
B 484,482	3,994,017	Mar. 23, 1976	Nov. 23, 1976
B 485,051	3,992,418	Feb. 17, 1976	Nov. 16, 1976
B 485,060	3,983,067	Feb. 17, 1976	Sep. 28, 1976
B 485,169	3,989,791	Mar. 16, 1976	Nov. 2, 1976
B 485,401	3,985,859	Jan. 27, 1976	Oct. 12, 1976
B 486,280	3,983,130	Feb. 3, 1976	Sep. 28, 1976
B 486,828	3,989,651	Mar. 2, 1976	Nov. 2, 1976
B 487,062	D 241,256	Feb. 10, 1976	Nov. 9, 1976
B 487,133	3,989,826	Jan. 27, 1976	Nov. 2, 1976
B 487,260	3,990,610	Jan. 27, 1976	Nov. 9, 1976
B 487,411	3,983,579	Feb. 24, 1976	Sep. 28, 1976
B 488,111	3,985,765	Jan. 13, 1976	Oct. 12, 1976
B 488,395	3,982,245	Jan. 27, 1976	Sep. 21, 1976
B 488,634	3,982,158	Jan. 20, 1976	Sep. 21, 1976
B 488,756	3,991,810	Mar. 16, 1976	Nov. 16, 1976
B 489,328	3,990,088	Jan. 20, 1976	Nov. 2, 1976
B 489,685	3,984,085	Feb. 24, 1976	Oct. 5, 1976
B 490,067	3,986,600	Jan. 27, 1976	Oct. 19, 1976
B 490,589	3,990,680	Feb. 3, 1976	Nov. 9, 1976
B 490,647	3,985,196	Feb. 24, 1976	Oct. 12, 1976
B 490,806	3,989,486	Feb. 3, 1976	Nov. 2, 1976
B 490,946	3,993,652	Feb. 17, 1976	Nov. 23, 1976
B 491,032	3,981,892	Feb. 10, 1976	Sep. 21, 1976
B 491,052	3,985,790	Mar. 2, 1976	Oct. 12, 1976
B 491,455	3,991,167	Feb. 3, 1976	Nov. 9, 1976
B 491,501	3,984,914	Jan. 13, 1976	Oct. 12, 1976
B 491,776	3,986,298	Mar. 16, 1976	Oct. 19, 1976
B 491,883	3,984,412	Feb. 3, 1976	Oct. 5, 1976
B 491,906	D 242,223	Feb. 10, 1976	Nov. 9, 1976
B 492,301	3,981,073	Jan. 13, 1976	Sep. 21, 1976
B 492,688	3,983,415	Jan. 20, 1976	Sep. 28, 1976
B 492,902	3,993,859	Feb. 24, 1976	Nov. 23, 1976
B 492,946	3,991,303	Jan. 27, 1976	Nov. 9, 1976
B 493,370	3,984,792	Mar. 16, 1976	Oct. 5, 1976
B 493,501	3,988,061	Feb. 3, 1976	Oct. 26, 1976
B 493,955	3,989,830	Mar. 9, 1976	Nov. 2, 1976
B 493,981	3,990,165	Mar. 9, 1976	Nov. 9, 1976
B 494,234	3,983,808	Feb. 10, 1976	Oct. 5, 1976
B 494,383	3,991,289	Feb. 3, 1976	Nov. 9, 1976
B 494,669	3,991,104	Feb. 3, 1976	Nov. 9, 1976
B 494,691	3,987,457	Mar. 16, 1976	Oct. 19, 1976
B 494,806	3,989,210	Feb. 3, 1976	Nov. 2, 1976
B 494,944	3,992,469	Feb. 17, 1976	Nov. 16, 1976
B 495,402	3,983,988	Feb. 17, 1976	Oct. 5, 1976
B 495,489	3,984,571	Feb. 3, 1976	Oct. 5, 1976
B 495,550	3,993,666	Feb. 3, 1976	Nov. 23, 1976
B 495,554	3,993,665	Feb. 3, 1976	Nov. 23, 1976
B 495,759	3,989,998	Feb. 3, 1976	Nov. 2, 1976
B 496,430	3,991,140	Feb. 10, 1976	Nov. 9, 1976
B 496,431	3,985,894	Jan. 13, 1976	Oct. 12, 1976
B 496,487	3,982,261	Jan. 20, 1976	Sep. 21, 1976
B 496,500	3,985,962	Feb. 3, 1976	Oct. 12, 1976
B 496,502	3,987,444	Jan. 20, 1976	Oct. 19, 1976
B 496,999	3,983,804	Jan. 27, 1976	Oct. 5, 1976
B 497,021	3,985,039	Jan. 13, 1976	Oct. 12, 1976
B 497,194	3,988,267	Feb. 3, 1976	Oct. 26, 1976
B 497,473	3,990,839	Feb. 3, 1976	Nov. 9, 1976
B 497,584	3,988,184	Feb. 24, 1976	Oct. 26, 1976
B 497,853	3,987,934	Feb. 17, 1976	Oct. 26, 1976
B 497,960	3,991,325	Jan. 20, 1976	Nov. 9, 1976
B 498,775	3,993,868	Mar. 2, 1976	Nov. 23, 1976
B 498,205	3,989,611	Feb. 10, 1976	Nov. 2, 1976
B 498,500	3,982,241	Jan. 20, 1976	Sep. 21, 1976
B 498,775	3,993,868	Mar. 2, 1976	Nov. 23, 1976
B 499,171	3,985,192	Jan. 27, 1976	Oct. 12, 1976
B 499,227	3,981,344	Jan. 27, 1976	Sep. 21, 1976
B 499,352	3,981,391	Jan. 27, 1976	Sep. 21, 1976
B 499,718	3,990,058	Jan. 27, 1976	Nov. 2, 1976
B 500,981	3,984,681	Jan. 27, 1976	Oct. 5, 1976
B 501,122	3,981,385	Feb. 17, 1976	Sep. 21, 1976
B 501,181	3,984,761	Feb. 10, 1976	Oct. 5, 1976
B 501,253	3,994,015	Feb. 3, 1976	Nov. 23, 1976
B 501,317	3,985,643	Jan. 13, 1976	Oct. 12, 1976
B 501,415	3,982,051	Jan. 13, 1976	Sep. 21, 1976
B 501,540	3,985,694	Jan. 13, 1976	Oct. 12, 1976
B 501,993	3,981,606	Jan. 13, 1976	Sep. 21, 1976
B 502,289	3,982,274	Jan. 13, 1976	Sep. 21, 1976
B 502,381	D 242,231	Mar. 16, 1976	Nov. 9, 1976
B 502,540	3,983,698	Jan. 13, 1976	Oct. 5, 1976
B 502,571	D 242,433	Apr. 6, 1976	Nov. 23, 1976
B 502,589	3,989,652	Jan. 27, 1976	Nov. 2, 1976
B 502,652	3,989,186	Feb. 24, 1976	Nov. 2, 1976
B 502,667	3,991,431	Feb. 24, 1976	Nov. 16, 1976
B 502,973	3,982,161	Jan. 27, 1976	Sep. 21, 1976
B 502,993	3,992,489	Feb. 17, 1976	Nov. 16, 1976
B 503,029	3,986,879	Jan. 27, 1976	Oct. 19, 1976
B 503,436	3,988,819	Feb. 24, 1976	Nov. 2, 1976
B 503,579	3,989,680	Feb. 10, 1976	Nov. 2, 1976
B 503,742	3,989,756	Feb. 17, 1976	Nov. 2, 1976
B 503,780	3,990,055	Mar. 16, 1976	Nov. 2, 1976
B 503,817	3,988,307	Jan. 13, 1976	Oct. 26, 1976
B 504,056	3,993,923	Feb. 24, 1976	Nov. 23, 1976
B 504,061	3,987,534	Mar. 16, 1976	Oct. 26, 1976
B 504,169	3,981,219	Jan. 13, 1976	Sep. 21, 1976
B 504,778	3,986,650	Feb. 24, 1976	Oct. 19, 1976
B 504,899	3,991,273	Mar. 9, 1976	Nov. 9, 1976
B 505,126	3,981,745	Feb. 10, 1976	Sep. 21, 1976
B 505,689	3,987,631	Mar. 2, 1976	Oct. 26, 1976
B 505,813	3,985,175	Jan. 13, 1976	Oct. 12, 1976
B 506,144	3,991,147	Feb. 10, 1976	Nov. 9, 1976
B 506,148	3,988,319	Feb. 3, 1976	Oct. 26, 1976
B 506,167	3,990,652	Feb. 10, 1976	Nov. 9, 1976
B 506,286	3,982,085	Jan. 20, 1976	Sep. 21, 1976
B 506,461	3,987,348	Jan. 20, 1976	Oct. 19, 1976
B 506,566	3,985,402	Jan. 20, 1976	Oct. 12, 1976
B 506,744	3,981,176	Jan. 13, 1976	Sep. 21, 1976
B 506,916	3,986,140	Feb. 3, 1976	Oct. 12, 1976
B 506,926	3,993,232	Feb. 17, 1976	Nov. 23, 1976
B 507,087	3,991,389	Feb. 17, 1976	Nov. 9, 1976
B 507,647	3,982,240	Jan. 27, 1976	Sep. 21, 1976
B 508,118	3,992,283	Feb. 17, 1976	Nov. 16, 1976
B 508,119	3,992,285	Feb. 17, 1976	Nov. 16, 1976
B 508,369	3,985,847	Jan. 13, 1976	Oct. 12, 1976
B 508,817	3,989,891	Feb. 3, 1976	Nov. 2, 1976
B 508,940	3,981,321	Feb. 17, 1976	Sep. 21, 1976
B 508,961	3,987,477	Feb. 3, 1976	Oct. 19, 1976
B 509,185	3,989,996	Feb. 3, 1976	Nov. 2, 1976
B 509,238	3,982,399	Feb. 24, 1976	Sep. 28, 1976
B 509,606	3,989,986	Feb. 3, 1976	Nov. 2, 1976
B 510,281	3,993,215	Mar. 9, 1976	Nov. 23, 1976
B 510,346	D 242,207	Feb. 10, 1976	Nov. 9, 1976
B 510,521	3,990,656	Mar. 2, 1976	Nov. 9, 1976
B 510,588	3,981,539	Jan. 27, 1976	Sep. 21, 1976
B 510,677	3,989,541	Feb. 24, 1976	Nov. 2, 1976
B 510,850	3,989,841	Feb. 3, 1976	Nov. 2, 1976
B 510,855	3,981,059	Jan. 27, 1976	Sep. 21, 1976
B 510,998	3,992,336	Feb. 10, 1976	Nov. 16, 1976
B 511,099	3,990,162	Feb. 3, 1976	Nov. 9, 1976
B 511,156	3,981,364	Jan. 27, 1976	Sep. 21, 1976
B 511,346	3,984,072	Jan. 27, 1976	Oct. 5, 1976
B 511,407	3,981,485	Feb. 10, 1976	Sep. 21, 1976
B 511,454	3,982,333	Feb. 24, 1976	Sep. 28, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 511,885	3,981,346	Jan. 27, 1976	Sep. 21, 1976
B 511,886	3,989,991	Feb. 3, 1976	Nov. 2, 1976
B 511,909	3,981,183	Feb. 17, 1976	Sep. 21, 1976
B 512,324	3,985,084	Feb. 17, 1976	Oct. 12, 1976
B 512,547	3,984,193	Jan. 13, 1976	Oct. 5, 1976
B 512,745	3,981,294	Jan. 13, 1976	Sep. 21, 1976
B 512,849	3,982,141	Feb. 3, 1976	Sep. 21, 1976
B 513,014	3,991,113	Feb. 10, 1976	Nov. 9, 1976
B 513,280	3,988,211	Jan. 20, 1976	Oct. 26, 1976
B 513,368	3,982,138	Feb. 3, 1976	Sep. 21, 1976
B 513,706	3,986,064	Jan. 13, 1976	Oct. 12, 1976
B 513,756	3,993,869	Feb. 3, 1976	Nov. 23, 1976
B 513,789	3,981,599	Feb. 3, 1976	Sep. 21, 1976
B 514,687	3,986,522	Jan. 27, 1976	Oct. 19, 1976
B 515,135	3,990,085	Feb. 17, 1976	Nov. 2, 1976
B 515,303	3,987,939	Jan. 20, 1976	Oct. 26, 1976
B 515,455	3,982,149	Jan. 27, 1976	Sep. 21, 1976
B 515,908	3,984,676	Jan. 20, 1976	Oct. 5, 1976
B 516,002	3,988,638	Jan. 13, 1976	Oct. 26, 1976
B 516,032	3,986,634	Jan. 27, 1976	Oct. 19, 1976
B 516,047	3,985,741	Feb. 10, 1976	Oct. 12, 1976
B 516,060	3,983,572	Feb. 17, 1976	Sep. 28, 1976
B 516,069	3,986,208	Mar. 16, 1976	Oct. 12, 1976
B 516,296	3,984,404	Feb. 3, 1976	Oct. 5, 1976
B 516,564	3,993,931	Feb. 17, 1976	Nov. 23, 1976
B 516,804	3,991,209	Mar. 23, 1976	Nov. 9, 1976
B 516,825	3,988,885	Feb. 3, 1976	Nov. 2, 1976
B 517,762	3,986,065	Mar. 16, 1976	Oct. 12, 1976
B 518,226	3,993,509	Feb. 10, 1976	Nov. 23, 1976
B 518,656	3,989,732	Feb. 17, 1976	Nov. 2, 1976
B 518,859	3,989,971	Feb. 3, 1976	Nov. 2, 1976
B 518,999	3,990,323	Feb. 3, 1976	Nov. 9, 1976
B 519,095	3,993,621	Feb. 24, 1976	Nov. 23, 1976
B 519,377	3,987,223	Jan. 27, 1976	Oct. 19, 1976
B 519,446	3,985,815	Feb. 24, 1976	Oct. 12, 1976
B 519,485	3,991,134	Feb. 10, 1976	Nov. 9, 1976
B 519,486	3,992,481	Feb. 17, 1976	Nov. 16, 1976
B 519,487	3,992,337	Feb. 17, 1976	Nov. 16, 1976
B 519,932	3,988,618	Feb. 3, 1976	Oct. 26, 1976
B 519,979	3,982,067	Feb. 3, 1976	Sep. 21, 1976
B 520,063	3,989,934	Mar. 2, 1976	Nov. 2, 1976
B 520,075	3,989,935	Feb. 24, 1976	Nov. 2, 1976
B 520,076	3,989,936	Mar. 2, 1976	Nov. 2, 1976
B 520,082	3,989,937	Mar. 23, 1976	Nov. 2, 1976
B 520,256	3,985,730	Jan. 13, 1976	Oct. 12, 1976
B 520,341	3,992,028	Mar. 16, 1976	Nov. 16, 1976
B 520,384	3,986,592	Jan. 27, 1976	Oct. 19, 1976
B 520,514	3,988,308	Mar. 9, 1976	Oct. 26, 1976
B 520,543	3,986,768	Jan. 27, 1976	Oct. 19, 1976
B 520,613	3,991,341	Mar. 16, 1976	Nov. 9, 1976
B 520,924	3,982,113	Jan. 27, 1976	Sep. 21, 1976
B 520,928	3,983,617	Jan. 13, 1976	Oct. 5, 1976
B 521,044	3,983,435	Feb. 24, 1976	Sep. 28, 1976
B 521,045	3,983,433	Feb. 24, 1976	Sep. 28, 1976
B 521,046	3,983,434	Feb. 24, 1976	Sep. 28, 1976
B 521,324	3,983,143	Jan. 27, 1976	Sep. 28, 1976
B 521,480	3,982,665	Jan. 13, 1976	Sep. 28, 1976
B 521,600	3,981,458	Jan. 27, 1976	Sep. 21, 1976
B 521,620	3,983,749	Jan. 27, 1976	Oct. 5, 1976
B 521,711	3,989,835	Feb. 10, 1976	Nov. 2, 1976
B 521,984	3,983,220	Feb. 17, 1976	Sep. 28, 1976
B 521,986	3,981,607	Feb. 3, 1976	Sep. 21, 1976
B 522,038	3,993,119	Feb. 3, 1976	Nov. 23, 1976
B 522,227	3,992,904	Mar. 30, 1976	Nov. 23, 1976
B 522,309	3,991,603	Feb. 3, 1976	Nov. 16, 1976
B 522,354	3,984,959	Jan. 20, 1976	Oct. 12, 1976
B 522,577	3,982,123	Jan. 27, 1976	Sep. 21, 1976
B 523,696	3,986,071	Jan. 13, 1976	Oct. 12, 1976
B 523,885	3,981,040	Feb. 17, 1976	Sep. 21, 1976
B 523,952	3,988,707	Mar. 23, 1976	Oct. 26, 1976
B 524,026	3,992,206	Feb. 10, 1976	Nov. 16, 1976
B 524,121	3,982,536	Feb. 3, 1976	Sep. 28, 1976
B 524,179	3,985,872	Jan. 13, 1976	Oct. 12, 1976
B 524,464	3,985,580	Feb. 10, 1976	Oct. 12, 1976
B 525,809	3,985,040	Feb. 24, 1976	Oct. 12, 1976
B 525,961	3,985,557	Jan. 13, 1976	Oct. 12, 1976
B 526,106	3,990,073	Jan. 27, 1976	Nov. 2, 1976
B 526,190	3,982,129	Feb. 17, 1976	Sep. 21, 1976
B 526,289	3,992,641	Feb. 24, 1976	Nov. 16, 1976
B 526,388	3,992,017	Feb. 3, 1976	Nov. 16, 1976
B 526,445	3,984,978	Jan. 20, 1976	Oct. 12, 1976
B 526,510	3,989,708	Jan. 20, 1976	Nov. 2, 1976
B 526,997	3,985,695	Jan. 13, 1976	Oct. 12, 1976
B 527,054	3,981,559	Feb. 17, 1976	Sep. 21, 1976
B 527,669	3,982,206	Jan. 13, 1976	Sep. 21, 1976
B 527,788	D 242,337	Feb. 10, 1976	Nov. 16, 1976
B 527,999	3,981,682	Feb. 3, 1976	Sep. 21, 1976
B 528,303	3,991,023	Feb. 10, 1976	Nov. 9, 1976
B 528,401	3,991,619	Feb. 3, 1976	Nov. 16, 1976
B 528,756	3,990,476	Feb. 3, 1976	Nov. 9, 1976
B 528,761	3,982,221	Feb. 10, 1976	Sep. 21, 1976
B 528,962	3,989,666	Feb. 24, 1976	Nov. 2, 1976
B 528,966	3,989,667	Feb. 24, 1976	Nov. 2, 1976
B 529,156	3,989,158	Jan. 13, 1976	Nov. 2, 1976
B 529,974	3,987,098	Feb. 17, 1976	Oct. 19, 1976
B 530,174	3,993,635	Feb. 24, 1976	Nov. 23, 1976
B 530,318	3,985,752	Jan. 13, 1976	Oct. 12, 1976
B 530,605	3,989,064	Feb. 3, 1976	Nov. 2, 1976
B 530,813	3,986,131	Feb. 17, 1976	Oct. 12, 1976
B 530,925	3,983,161	Feb. 24, 1976	Sep. 28, 1976
B 531,096	3,984,415	Feb. 10, 1976	Oct. 5, 1976
B 531,425	3,992,595	Feb. 3, 1976	Nov. 16, 1976
B 531,686	3,990,017	Mar. 23, 1976	Nov. 2, 1976
B 531,753	3,988,843	Mar. 2, 1976	Nov. 2, 1976
B 531,929	3,986,067	Jan. 20, 1976	Oct. 12, 1976
B 532,005	3,992,397	Feb. 24, 1976	Nov. 16, 1976
B 532,319	3,990,292	Feb. 3, 1976	Nov. 9, 1976
B 532,326	3,993,959	Mar. 23, 1976	Nov. 23, 1976
B 532,424	D 242,292	Feb. 10, 1976	Nov. 9, 1976
B 532,476	3,992,756	Feb. 3, 1976	Nov. 23, 1976
B 532,901	3,984,318	Jan. 13, 1976	Oct. 5, 1976
B 532,969	3,981,706	Jan. 13, 1976	Sep. 21, 1976
B 533,056	3,983,969	Jan. 13, 1976	Oct. 5, 1976
B 533,580	3,982,255	Feb. 3, 1976	Sep. 21, 1976
B 533,734	3,984,799	Jan. 27, 1976	Oct. 5, 1976
B 533,968	3,986,576	Jan. 27, 1976	Oct. 19, 1976
B 534,016	3,983,381	Feb. 3, 1976	Sep. 28, 1976
B 534,313	3,981,675	Jan. 27, 1976	Sep. 21, 1976
B 534,314	3,981,786	Feb. 10, 1976	Sep. 21, 1976
B 534,333	3,981,480	Feb. 17, 1976	Sep. 21, 1976
B 534,443	3,989,970	Jan. 27, 1976	Nov. 2, 1976
B 534,591	3,991,141	Feb. 17, 1976	Nov. 9, 1976
B 534,767	3,982,180	Feb. 3, 1976	Sep. 21, 1976
B 534,991	3,983,517	Jan. 27, 1976	Sep. 28, 1976
B 535,076	3,981,718	Jan. 20, 1976	Sep. 21, 1976
B 535,386	3,981,150	Jan. 13, 1976	Sep. 21, 1976
B 535,391	3,981,386	Jan. 27, 1976	Sep. 21, 1976
B 535,411	3,990,543	Feb. 24, 1976	Nov. 9, 1976
B 535,466	3,981,309	Jan. 27, 1976	Sep. 21, 1976
B 535,813	3,981,819	Jan. 27, 1976	Sep. 21, 1976
B 535,928	3,981,466	Jan. 13, 1976	Sep. 21, 1976
B 536,009	3,982,112	Jan. 27, 1976	Sep. 21, 1976
B 536,675	3,985,773	Jan. 20, 1976	Oct. 12, 1976
B 536,935	3,985,729	Jan. 13, 1976	Oct. 12, 1976
B 537,102	3,981,829	Jan. 13, 1976	Sep. 21, 1976
B 537,709	3,981,368	Jan. 13, 1976	Sep. 21, 1976
B 537,711	3,985,748	Jan. 13, 1976	Oct. 12, 1976
B 537,722	3,985,423	Feb. 3, 1976	Oct. 12, 1976
B 537,903	3,986,492	Jan. 20, 1976	Oct. 19, 1976
B 538,472	3,992,884	Feb. 3, 1976	Nov. 23, 1976
B 538,491	3,982,928	Feb. 17, 1976	Sep. 28, 1976
B 538,686	3,982,199	Jan. 13, 1976	Sep. 21, 1976
B 538,753	3,993,642	Feb. 10, 1976	Nov. 23, 1976
B 539,746	3,983,423	Feb. 17, 1976	Sep. 28, 1976
B 540,078	3,984,701	Jan. 13, 1976	Oct. 5, 1976
B 540,218	3,986,108	Feb. 10, 1976	Oct. 12, 1976
B 540,632	3,981,600	Jan. 13, 1976	Sep. 21, 1976
B 540,767	3,986,010	Mar. 16, 1976	Oct. 12, 1976
B 540,872	3,982,135	Jan. 20, 1976	Sep. 21, 1976
B 541,015	3,993,208	Jan. 27, 1976	Nov. 23, 1976
B 541,376	3,981,690	Feb. 17, 1976	Sep. 21, 1976
B 541,415	3,982,080	Feb. 3, 1976	Sep. 21, 1976
B 541,496	3,982,232	Jan. 27, 1976	Sep. 21, 1976
B 541,517	3,986,156	Jan. 13, 1976	Oct. 12, 1976
B 542,135	3,986,939	Feb. 10, 1976	Oct. 19, 1976
B 542,158	3,981,886	Jan. 13, 1976	Sep. 21, 1976
B 542,226	3,993,748	Feb. 24, 1976	Nov. 23, 1976
B 543,941	3,985,528	Jan. 13, 1976	Oct. 12, 1976
B 544,476	3,993,585	Feb. 24, 1976	Nov. 23, 1976
B 544,961	3,983,492	Jan. 13, 1976	Sep. 28, 1976
B 545,050	3,982,073	Jan. 20, 1976	Sep. 21, 1976
B 545,464	3,992,387	Feb. 10, 1976	Nov. 16, 1976
B 545,630	3,981,337	Jan. 27, 1976	Sep. 21, 1976
B 545,935	3,990,337	Jan. 27, 1976	Nov. 9, 1976
B 546,295	3,987,070	Jan. 20, 1976	Oct. 19, 1976
B 546,426	3,982,063	Jan. 27, 1976	Sep. 21, 1976
B 546,631	3,983,729	Feb. 3, 1976	Oct. 5, 1976
B 546,665	3,990,062	Jan. 20, 1976	Nov. 2, 1976
B 546,911	3,981,058	Jan. 13, 1976	Sep. 21, 1976
B 546,922	3,987,742	Mar. 16, 1976	Oct. 26, 1976
B 547,994	3,990,081	Jan. 20, 1976	Nov. 2, 1976
B 548,028	3,991,517	Feb. 3, 1976	Nov. 16, 1976
B 548,058	3,983,050	Feb. 17, 1976	Sep. 28, 1976
B 548,155	3,981,477	Jan. 13, 1976	Sep. 21, 1976

CROSS REFERENCE OF PUBLISHED PATENT APPLICATIONS PUBLISHED UNDER SECOND TRIAL VOLUNTARY PROTEST PROGRAM AND NOW ISSUED AS PATENTS—CONTINUED

DOCUMENT NUMBER	PATENT NUMBER	PUB. DATE	ISSUE DATE
B 548,440	3,993,401	Feb. 3, 1976	Nov. 23, 1976
B 548,302	3,983,414	Feb. 17, 1976	Sep. 28, 1976
B 548,440	3,993,401	Feb. 3, 1976	Nov. 23, 1976
B 548,462	D 242,283	Feb. 10, 1976	Nov. 9, 1976
B 548,719	3,990,553	Feb. 17, 1976	Nov. 9, 1976
B 549,198	3,981,975	Jan. 13, 1976	Sep. 21, 1976
B 549,244	3,981,125	Jan. 27, 1976	Sep. 21, 1976
B 549,394	3,981,611	Jan. 27, 1976	Sep. 21, 1976
B 549,931	3,986,141	Jan. 20, 1976	Oct. 12, 1976
B 550,693	3,982,194	Jan. 20, 1976	Sep. 21, 1976
B 550,744	3,993,550	Feb. 17, 1976	Nov. 23, 1976
B 551,527	3,982,599	Jan. 13, 1976	Sep. 28, 1976
B 552,006	3,992,129	Feb. 3, 1976	Nov. 16, 1976
B 552,498	3,983,139	Jan. 13, 1976	Sep. 28, 1976
B 552,932	3,989,292	Feb. 3, 1976	Nov. 2, 1976
B 553,460	3,990,019	Feb. 3, 1976	Nov. 2, 1976
B 553,584	3,992,456	Feb. 17, 1976	Nov. 16, 1976
B 554,283	3,981,152	Jan. 27, 1976	Sep. 21, 1976
B 554,594	3,985,960	Jan. 20, 1976	Oct. 12, 1976
B 554,939	3,994,013	Feb. 10, 1976	Nov. 23, 1976
B 555,437	3,991,152	Feb. 3, 1976	Nov. 9, 1976
B 555,456	3,993,423	Mar. 30, 1976	Nov. 23, 1976
B 555,772	3,982,641	Jan. 13, 1976	Sep. 28, 1976
B 556,057	3,985,349	Jan. 13, 1976	Oct. 12, 1976
B 556,496	3,990,244	Mar. 16, 1976	Nov. 9, 1976
B 556,897	3,992,972	Feb. 3, 1976	Nov. 23, 1976
B 557,153	3,991,603	Feb. 3, 1976	Nov. 16, 1976
B 557,299	3,990,357	Feb. 3, 1976	Nov. 9, 1976
B 557,621	3,990,800	Feb. 3, 1976	Nov. 9, 1976
B 557,856	3,991,019	Feb. 10, 1976	Nov. 9, 1976
B 558,220	3,990,009	Jan. 27, 1976	Nov. 2, 1976
B 558,251	3,981,289	Jan. 13, 1976	Sep. 21, 1976
B 558,813	3,989,188	Feb. 3, 1976	Nov. 2, 1976
B 558,818	3,983,762	Jan. 13, 1976	Oct. 5, 1976
B 558,819	3,990,160	Feb. 3, 1976	Nov. 9, 1976
B 558,973	3,981,126	Feb. 10, 1976	Sep. 21, 1976
B 559,111	3,984,854	Feb. 24, 1976	Oct. 5, 1976
B 559,737	3,984,668	Jan. 20, 1976	Oct. 5, 1976
B 559,954	3,982,673	Feb. 3, 1976	Sep. 28, 1976
B 560,261	3,987,493	Mar. 16, 1976	Oct. 19, 1976
B 560,488	3,989,940	Mar. 16, 1976	Nov. 2, 1976
B 560,717	3,982,034	Feb. 10, 1976	Sep. 21, 1976
B 560,765	3,983,389	Feb. 3, 1976	Sep. 28, 1976
B 561,062	D 242,248	Feb. 10, 1976	Nov. 9, 1976
B 561,387	3,985,706	Feb. 10, 1976	Oct. 12, 1976
B 561,712	3,992,126	Feb. 17, 1976	Nov. 16, 1976
B 561,732	3,991,460	Feb. 3, 1976	Nov. 16, 1976
B 561,764	3,984,634	Jan. 27, 1976	Oct. 5, 1976
B 561,784	3,984,710	Jan. 27, 1976	Oct. 5, 1976
B 562,462	3,985,836	Jan. 13, 1976	Oct. 12, 1976
B 562,698	3,983,972	Jan. 13, 1976	Oct. 5, 1976
B 562,813	3,985,491	Feb. 3, 1976	Oct. 12, 1976
B 563,244	3,983,562	Jan. 27, 1976	Sep. 28, 1976
B 563,412	3,992,127	Feb. 24, 1976	Nov. 16, 1976
B 563,722	3,990,925	Jan. 13, 1976	Nov. 9, 1976
B 563,780	3,987,769	Feb. 3, 1976	Oct. 26, 1976
B 564,314	3,984,996	Jan. 20, 1976	Oct. 12, 1976
B 565,180	3,981,685	Jan. 27, 1976	Sep. 21, 1976
B 565,275	3,990,299	Apr. 6, 1976	Nov. 9, 1976
B 566,572	3,988,590	Mar. 16, 1976	Oct. 26, 1976
B 567,058	3,985,188	Jan. 13, 1976	Oct. 12, 1976
B 567,158	3,988,073	Mar. 23, 1976	Oct. 26, 1976
B 567,207	3,991,689	Apr. 13, 1976	Nov. 16, 1976
B 567,854	3,985,038	Feb. 3, 1976	Oct. 12, 1976
B 568,226	3,992,698	Feb. 24, 1976	Nov. 16, 1976
B 568,770	3,982,213	Feb. 10, 1976	Sep. 21, 1976
B 569,125	3,986,980	Feb. 24, 1976	Oct. 19, 1976
B 569,519	3,993,133	Feb. 3, 1976	Nov. 23, 1976
B 569,646	3,985,222	Jan. 13, 1976	Oct. 12, 1976
B 570,172	3,987,763	Feb. 3, 1976	Oct. 26, 1976
B 570,862	3,991,639	Feb. 24, 1976	Nov. 16, 1976
B 571,219	3,991,388	Feb. 24, 1976	Nov. 9, 1976
B 572,642	3,990,715	Feb. 10, 1976	Nov. 9, 1976
B 574,128	3,982,961	Feb. 17, 1976	Sep. 28, 1976
B 574,996	3,989,718	Feb. 17, 1976	Nov. 2, 1976
B 575,757	3,981,170	Jan. 27, 1976	Sep. 21, 1976
B 575,851	3,985,826	Feb. 10, 1976	Oct. 12, 1976
B 576,859	3,991,526	Feb. 24, 1976	Nov. 16, 1976
B 578,447	3,982,658	Jan. 20, 1976	Sep. 28, 1976
B 579,104	3,982,081	Jan. 27, 1976	Sep. 21, 197
B 579,116	3,986,227	Feb. 3, 1976	Oct. 19, 1976
B 580,826	3,988,391	Feb. 17, 1976	Oct. 26, 1976
B 580,921	3,984,054	Jan. 13, 1976	Oct. 5, 1976
B 583,051	3,990,714	Feb. 3, 1976	Nov. 9, 1976
B 583,089	3,982,174	Jan. 27, 1976	Sep. 21, 1976
B 584,520	3,981,149	Jan. 27, 1976	Sep. 21, 1976
B 585,247	3,989,914	Feb. 3, 1976	Nov. 2, 1976
B 585,731	3,993,603	Feb. 3, 1976	Nov. 23, 1976
B 586,215	3,985,302	Jan. 20, 1976	Oct. 12, 1976
B 586,380	3,983,885	Mar. 2, 1976	Oct. 5, 1976
B 586,387	3,981,311	Feb. 3, 1976	Sep. 21, 1976
B 586,663	3,992,080	Feb. 3, 1976	Nov. 16, 1976
B 587,786	3,991,204	Feb. 17, 1976	Nov. 9, 1976
B 589,966	3,985,828	Feb. 17, 1976	Oct. 12, 1976
B 590,158	3,985,163	Feb. 10, 1976	Oct. 12, 1976
B 590,159	3,985,164	Feb. 3, 1976	Oct. 12, 1976
B 592,143	3,984,713	Jan. 27, 1976	Oct. 5, 1976
B 596,692	3,992,349	Feb. 17, 1976	Nov. 16, 1976
B 657,438	3,985,701	Jan. 20, 1976	Oct. 12, 1976
B 747,785	3,981,899	Feb. 10, 1976	Sep. 21, 1976
B 843,038	3,981,785	Feb. 3, 1976	Sep. 21, 1976
B 848,336	3,993,752	Mar. 30, 1976	Nov. 23, 1976

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 23RD DAY OF NOVEMBER, 1976

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

ACME Electric Corporation: *See*—
Brown, Harold J., Re. 29,048.

Badische Anilin- & Soda-Fabrik Aktiengesellschaft: *See*—
Schoettle, Klaus; Hack, Joachim; Loewenberg, Gustav; and Hoffmann, Werner, Re. 29,049.

Brindley, Robert E., to Union Carbide Corporation. Push button switching module for flashlights. Re. 29,047, Cl. 240-10.660.

Brown, Harold J., to ACME Electric Corporation. AC and DC regulator circuit. Re. 29,048, Cl. 321-18.000.

David, Harry, to Hauni-Werke Korber & Co. KG. Apparatus for building a tobacco stream. Re. 29,042, Cl. 131-84.00B.

DelPaggio, Anthony F., to Park-Ohio Industries, Inc. Method and apparatus for inductively heating valve seats. Re. 29,046, Cl. 219-10.570.

Fukuoka, Tatsuo. Footwear. Re. 29,041, Cl. 36-11.500.

Hack, Joachim: *See*—
Schoettle, Klaus; Hack, Joachim; Loewenberg, Gustav; and Hoffmann, Werner, Re. 29,049.

Hauni-Werke Korber & Co. KG: *See*—
David, Harry, Re. 29,042.

Hoffmann, Werner: *See*—
Schoettle, Klaus; Hack, Joachim; Loewenberg, Gustav; and Hoffmann, Werner, Re. 29,049.

Kabushiki Kaisha Seisan Nihon Sha: *See*—
Naito, Kakuji. Re. 29,043.

Kobayashi, Katuhiro: *See*—
Konno, Koji; and Kobayashi, Katuhiro, Re. 29,044.

Konno, Koji; and Kobayashi, Katuhiro, to Kureha Kagaku Kogyo Kabushiki Kaisha. Method for the preparation of acetyl chloride. Re. 29,044, Cl. 204-163.00R.

Kureha Kagaku Kogyo Kabushiki Kaisha: *See*—
Konno, Koji; and Kobayashi, Katuhiro, Re. 29,044.

Loewenberg, Gustav: *See*—
Schoettle, Klaus; Hack, Joachim; Loewenberg, Gustav; and Hoffmann, Werner, Re. 29,049.

Naito, Kakuji, to Kabushiki Kaisha Seisan Nihon Sha. Method and apparatus for manufacturing synthetic resin bags having occludent means in the inside surface thereof. Re. 29,043, Cl. 156-244.000.

Owens-Illinois, Inc.: *See*—
Uhlig, Albert R., Re. 29,045.

Park-Ohio Industries, Inc.: *See*—
DelPaggio, Anthony F., Re. 29,046.

Schoettle, Klaus; Hack, Joachim; Loewenberg, Gustav; and Hoffmann, Werner, to Badische Anilin- & Soda-Fabrik Aktiengesellschaft. Tape recorder and magnetic tape cassette with movable tensioning and brake means. Re. 29,049, Cl. 360-96.000.

Uhlig, Albert R., to Owens-Illinois, Inc. Method for blow molding plastic articles. Re. 29,045, Cl. 264-89.000.

Union Carbide Corporation: *See*—
Brindley, Robert E., Re. 29,047.

LIST OF PLANT PATENTEES

Armstrong, David L., to Armstrong Nurseries, Inc. Rose plant. 3,983, 11–23–76, Cl. 14.

Armstrong Nurseries, Inc.: *See*—
Armstrong, David L. 3,983.

Hetherington, Ernest E., to Fred A. Stewart, Inc. Orchid. 3,984, 11–23–76, Cl. 68.

Stewart, Fred A., Inc.: *See*—
Hetherington, Ernest E. 3,984.

LIST OF DESIGN PATENTEES

ABL Associates, Inc.: *See*—
Enckler, Albert J. 242,407.
Enckler, Albert J. 242,408.
Enckler, Albert J. 242,409.

Achenbach, Walter B., to Owens-Illinois, Inc. Beverage glass or similar article. 242,416, 11–23–76, Cl. D7—15.

Acosta, Higenia. Electrical plug. 242,464, 11–23–76, Cl. D26—1.

Acoustic Fiber Sound Systems, Inc.: *See*—
Croup, Robert E. 242,474.

Action Industries, Inc.: *See*—
Salladay, Mack. 242,414.

Anchor Hocking Corp.: *See*—
Benes, Frank J. 242,415.

Arbib, Philip B., and R. Aribib, to Bib Hi-Fi Accessories Ltd. Cleaning arm for phonograph records. 242,483, 11–23–76, Cl. D56—4.

Arabib, Richard: *See*—
Arabib, Philip B., and R. 242,483.

Arluck, Elmer M., to Thermo-Mold Medical Products, Inc. Orthopedic brace. 242,492, 11–23–76, Cl. D83—1.

Arnold, Dagmar L., D. G. Molerin, and P. C. Yenerich, to International Business Machines Corp. Teller station. 242,469, 11–23–76, Cl. D26—5.

Backstrom, Olof F., to Oy. Fiskars AB, Embroidery scissors. 242,425, 11–23–76, Cl. D8—57.

Beckman, Carol T. Cover for an aquarium or the like. 242,476, 11–23–76, Cl. D30—12.

Belkin, Nathan L., to Superior Surgical Mfg. Co., Inc. Surgical drape. 242,490, 11–23–76, Cl. D83—1.

Bell & Howell Co.: *See*—
Bookless, George W., Samczyk, and Schulz. 242,485.

Benes, Frank J., to Anchor Hocking Corp. Cup or similar article. 242,415, 11–23–76, Cl. D7—9.

Bookless, George W., C. S. Samczyk, and H. C. Schulz, to Bell & Howell Co. Disposable microfilm cartridge. 242,485, 11–23–76, Cl. D26—148.

Bib Hi-Fi Accessories Ltd.: *See*—
Arbib, Philip B., and R. 242,483.

Bloxwich Lock and Stamping Co. Ltd.: *See*—
Morris, Barry S. 242,428.

Borg-Warner Corp.: *See*—
Burroughs, James E. 242,489.

Bratene, Osbjorn, and D. F. Marocco. Ball holding attachment for belts. 242,402, 11–23–76, Cl. D2—400.

Brookline Delta Ltd.: *See*—
Davies, Hugh R. 242,461.

Brown, Robert C., Sr. Roll tape dispenser. 242,452, 11–23–76, Cl. D19—69.

Bruckner, James V., to Metal Stamping Corp. License tag. 242,500, 11–23–76, Cl. D96—12.

Bruckner, James V., to Metal Stamping Corp. License plate. 242,501, 11–23–76, Cl. D96—12.

Brunton Co., The: *See*—
Kramer, Melvin G. 242,437.

Burroughs, James E., to Borg-Warner Corp. Mouthpiece for breath testing devices or the like. 242,489, 11–23–76, Cl. D83—1.

Campagna, Gary J., and R. C. Janson. Ocular positioning device for an eye drop dispenser. 242,491, 11–23–76, Cl. D83—1.

Canada Cycle & Motor Co. Ltd.: *See*—
Cox, Malcolm F. 242,399.

Capitol Products Corp.: *See*—
Cribben, James T. 242,463.

Carroll, James C., and L. T. Johnson, to Phillips Petroleum Co. Bakery tray or the like. 242,496, 11–23–76, Cl. D87—1.

Carroll, Richard A., to Lorac Co., Inc. Sign clip. 242,431, 11–23–76, Cl. D8—243.

Conner, James M., D. H. Hendry, and B. K. Johnson, to Polaroid Corp. Photographic camera or similar article. 242,447, 11–23–76, Cl. D16—1.

Cox, Malcolm F., to Canada Cycle & Motor Co. Ltd. Sports helmet. 242,399, 11–23–76, Cl. D2—231.

Cribben, James T., to Capitol Products Corp. Lawn building. 242,463, 11–23–76, Cl. D23—24.

Croup, Robert E., to Acoustic Fiber Sound Systems, Inc. Loudsneaker. 242,474, 11–23–76, Cl. D26—14.

Culligan, Robert L. Convertible waste basket/step stool. 242,423, 11–23–76, Cl. D7—191.

Damast, David. Nameplate. 242,429, 11–23–76, Cl. D8—180.

Davies, Hugh R., to Brookline Delta Ltd. Container for deodorants or the like. 242,461, 11–23–76, Cl. D23—150.

Dictaphone Corp.: *See*—
Pulos, Arthur J., and Moro. 242,473.
Digital Equipment Corp.: *See*—
Jenkins, Paul A. 242,467.
Dupont, S. T.: *See*—
Malamoud, Jean G. 242,475.
Dynastor, Inc.: *See*—
Heidecker, Robert F., Johnson, Monigle, and Royer. 242,465.
Enckler, Albert J., to ABL Associates, Inc. Pegboard mounted support for sabre saws, jigsaws, or the like. 242,407, 11–23–76. Cl. D6—114.
Enckler, Albert J., to ABL Associates, Inc. Pegboard mounted support for screwdrivers. 242,408, 11–23–76. Cl. D6—125.
Enckler, Albert J., to ABL Associates, Inc. Pegboard mounted support. 242,409, 11–23–76, Cl. D6—125.
Factor, Max. & Co.: *See*—
Montgomery, Robin M. 242,495.
Fairchild Camera and Instrument Corp.: *See*—
Nilson, Brent. 242,436.
Farmer, Robert M. Toy fire station. 242,481, 11–23–76, Cl. D34—15.
Fister, Judith W. Table. 242,412, 11–23–76, Cl. D6—175.
Folkmanis, Judith L. Hand puppet. 242,477, 11–23–76, Cl. D34—2.
Fountain Industries, Inc.: *See*—
Syverson, Martelle J. 242,498.
Friedman, Bernard: *See*—
Friedman, Bernard. 242,418.
Friedman, Bernard, to Bernard Friedman. Strainer. 242,418, 11–23–76, Cl. D7—17.
Friedman, Jack, to L.J.N. Toys, Ltd. Phonograph housing. 242,484. 11–23–76. Cl. D36—4.
Fyffe, Billy D. Industrial vacuum unit. 242,482, 11–23–76, Cl. D15—54.
Garrison, Lynden H. Cycle differential axle. 242,442, 11–23–76, Cl. D12—114.
General Electric Co.: *See*—
Pitstick, Martin H., and Schmitt. 242,421.
Shalvoy, John C. 242,494.
Genovese, Enrico. Shampoo dispenser. 242,405, 11–23–76, Cl. D6—95.
Gerst, Joseph J. Dust collector. 242,459, 11–23–76, Cl. D23—149.
Gervais, Henry O., to Hybrid Systems Ltd. Golf cart. 242,439, 11–23–76, Cl. D12—16.
Girling Ltd.: *See*—
Holper, Reinhard. 242,444.
Kolb, Norbert. 242,445.
Glaberson, Martin, to Warner-Lambert Co. Adjustable safety razor cartridge. 242,499, 11–23–76, Cl. D95—3.
Goldberger, Miklos. Pick up truck or the like. 242,440, 11–23–76, Cl. D12—98.
Gottsegen, Marten. Jug. 242,432, 11–23–76, Cl. D9—39.
Goulooze, Ivan F. Multiple station desk. 242,410, 11–23–76, Cl. D6—146.
Haggerty, Patrick F., Jr. Combined tennis racket and ball carrying case. 242,497, 11–23–76, Cl. D87—1.
Halliburton Co.: *See*—
Zamora, Mario. 242,451.
Harrington, Bardley A. Boot. 242,400, 11–23–76, Cl. D2—272.
Heidecker, Robert F., A. K. Johnson, G. W. Monigle, and G. B. Royer, to Dynastor, Inc. Disc cartridge for data processing equipment. 242,465, 11–23–76, Cl. D26—5.
Hendry, Donald H.: *See*—
Conner, James M., Hendry, and Johnson. 242,447.
Holper, Reinhard, to Girling Ltd. Pad hold-down spring for a disc brake. 242,444, 11–23–76, Cl. D12—180.
Howard Worthington, Inc.: *See*—
Worthington, Howard W. 242,430.
Howell, Jimmie S. Marble gaming table. 242,478, 11–23–76, Cl. D34—5.
Hubitsky, John E. Three-dimensional sign. 242,502, 11–23–76, Cl. D96—12.
Hybrid Systems Ltd.: *See*—
Gervais, Henry O. 242,439.
IMI Opella Ltd.: *See*—
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Jones, Wilfred L. 242,455.
Ing. C. Olivetti & C., S.p.A.: *See*—
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IVAC Corp.: *See*—
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Jahraus, Rudi, to Moriz Hausch GmbH. Writing pen. 242,449, 11–23–76, Cl. D19—45.
Jahraus, Rudi, to Moriz Hausch GmbH. Writing pen. 242,450, 11–23–76, Cl. D19—45.
Janson, Roland C.: *See*—
Campagna, Gary J., and Janson. 242,491.
Jenkins, Paul A., to Digital Equipment Corp. Front panel for a computer console. 242,467, 11–23–76, Cl. D26—5.
Jinbo, Katsumi, to Sharp Kabushiki Kaisha. Electronic calculating machine. 242,472, 11–23–76, Cl. D26—5.
Johnson, Albin K.: *See*—
Heidecker, Robert F., Johnson, Monigle, and Royer. 242,465.
Johnson, Bruce K.: *See*—
Conner, James M., Hendry, and Johnson. 242,447.
Johnson, Lewis T.: *See*—
Carroll, James C., and Johnson. 242,496.
Jones, Wilfred L., to IMI Opella Ltd. Faucet. 242,454, 11–23–76, Cl. D23—26.
Jones, Wilfred L., to IMI Opella Ltd. Faucet body. 242,455, 11–23–76, Cl. D23—32.
Kissel, James L. Disaster alarm cabinet. 242,438, 11–23–76, Cl. D10—106.
Kitai, Isao, to Sharp Kabushiki Kaisha. Electronic calculating machine. 242,466, 11–23–76, Cl. D26—5.
Kitai, Isao, to Sharp Kabushiki Kaisha. Electronic calculating machine. 242,470, 11–23–76, Cl. D25—5.
Kitai, Isao, to Sharp Kabushiki Kaisha. Electronic calculating machine. 242,471, 11–23–76, Cl. D26—5.
Knowles, Charicia F. Revolving-indicator world time clock. 242,434, 11–23–76, Cl. D10—10.
Kolb, Norbert, to Girling Ltd. Pad anti-rattle spring for a disc brake. 242,445, 11–23–76, Cl. D12—180.
Kramer, Melvin G., to The Brunton Co. Digital display compass. 242,437, 11–23–76, Cl. D10—68.
Kudo, Nihachi. Fruit knife. 242,422, 11–23–76, Cl. D8—143.
L.J.N. Toys, Ltd.: *See*—
Friedman, Jack. 242,484.
Landsberger, Kurt. Raised superimposed toilet seat or the like. 242,457, 11–23–76, Cl. D23—71.
Lorac Co., Inc.: *See*—
Carroll, Richard A. 242,481.
Lopez-Jose A., to Camilo Muebles, Inc. Chair. 242,404, 11–23–76, Cl. D6—30.
Malamoud, Jean G., to S. T. Dupont. Cigarette lighter. 242,475, 11–23–76, Cl. D27—42.
Marocco, David F.: *See*—
Bratene, Osbjorn, and Marocco. 242,402.
McGregor, Daniel P.: *See*—
McGregor, John C., Sr., D. P., and J. B. 242,443.
McGregor, John C., Sr., D. P., and J. B. Sprocket. 242,443, 11–23–76, Cl. D12—123.
McGregor, James B.: *See*—
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McNabb, David F., to Safe-T-Bath. Storm shelter. 242,446, 11–23–76, Cl. D25—36.
Metal Stamping Corp.: *See*—
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Bruckner, James V. 242,501.
Molerin, Dallas G.: *See*—
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Monigle, Glenn W.: *See*—
Heidecker, Robert F., Johnson, Monigle, and Royer. 242,465.
Montgomery, Robin M., to Max Factor & Co. Makeup pot. 242,495, 11–23–76, Cl. D86—10.
Morgret, Kenneth W. Sheet metal channel opener. 242,424, 11–23–76, Cl. D8—51.
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Jahraus, Rudi. 242,449.
Jahraus, Rudi. 242,450.
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Morris, Barry S., to Bloxwich Lock and Stamping Co. Ltd. Cam for a fastening mechanism for container doors. 242,428. 11–23–76, Cl. D8—137.
Mosley, Clifton G. Incense burner. 242,458, 11–23–76, Cl. D23—78.
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Tonnessen, Arne. 242,453.
Muebles, Camilo, Inc.: *See*—
Lopez, Jose A. 242,404.
Nagle, Joseph J. Tricycle body. 242,441, 11–23–76, Cl. D12—112.
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Olson, Dennis E. Decorator display stand. 242,413, 11–23–76, Cl. D6—191.
Owens-Illinois, Inc.: *See*—
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Oy. Fiskars AB: *See*—
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Panek, Gregory C. Golf ball retriever. 242,479, 11–23–76, Cl. D34—5.
Phillips Petroleum Co.: *See*—
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Pitstick, Martin H., and C. H. Schmitt, to General Electric Co. Microwave oven. 242,421, 11–23–76, Cl. D7—128.
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Conner, James M., Hendry, and Johnson. 242,447.
Pulos, Arthur J., and J. C. Moro, to Dictaphone Corp. Telephone call diverter. 242,473, 11–23–76, Cl. D26—14.
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Romanoff, David L. First-aid cabinet. 242,406, 11–23–76, Cl. D6—104.
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Russell, Mitchell J. Game die. 242,480, 11–23–76, Cl. D34—5.
Safe-T-Bath: *See*—
McNabb, David F. 242,446.
Salladay, Mack, to Action Industries, Inc. Combined tie and belt hanger. 242,414, 11–23–76, Cl. D6—251.
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Schulz, Herman C.: *See*—
Bookless, George W. Samczyk, and Schulz. 242,485.
Shalvoy, John C., to General Electric Co. Hair dryer or similar article. 242,494, 11–23–76, Cl. D86—10.
Shames, Harold: *See*—
Shames, Sidney J., and H. 242,462.
Shames, Sidney J., and H. Cover for a vent opening. 242,462, 11–23–76, Cl. D23—154.
Sharp Kabushiki Kaisha: *See*—
Kitai, Isao. 242,466.
Kitai, Isao. 242,470.
Kitai, Isao. 242,471.
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Smith, Thomas M., to Monarch Marking Systems, Inc. Package of label rolls. 242,433, 11–23–76, Cl. D9—193.
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Sottsass, Ettore, Jr., to Ing. C. Olivetti & Q C., S.p.A. Accounting terminal. 242,468, 11–23–76, Cl. D26—5.
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Belkin, Nathan L. 242,490.
Syverson, Martelle J., to Fountain Industries, Inc. Wall-supported beverage dispenser. 242,498, 11–23–76, Cl. D15—112.
Tairraz, Paul. Transparency viewer. 242,448, 11–23–76, Cl. D16—14.
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Twedell, Jack L. Hole cutting tool. 242,426, 11–23–76, Cl. D8—59.
Ura, Yoshihumi, and K. Sonoda, to Sharp Kabushiki Kaisha. Cooking range. 242,420, 11–23–76, Cl. D7—128.
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Walker, Fred T. 242,411.
Walker, Fred T., to Walker Foundry Co., Inc. Table or similar article of furniture. 242,411, 11–23–76, Cl. D6—147.
Warner, James A. Clock. 242,435, 11–23–76, Cl. D10—21.
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Glaberson, Martin. 242,499.
Webster, Donna J. Display stand for jewelry and the like. 242,403, 11–23–76, Cl. D6—24.
Willis, Lucinda. Toilet for children. 242,456, 11–23–76, Cl. D23—53.
Wilsbaard, Jan. Motor hammer. 242,427, 11–23–76, Cl. D8—67.
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CLASSIFICATION OF PATENTS

ISSUED NOVEMBER 23, 1976

NOTE.—First number, class; second number, subclass; third number, patent number

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3R 3,992,721
161R 3,992,723
173 3,992,724
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1.91 3,992,726

CLASS 4
10 3,992,727
67R 3,992,728
110 3,992,729
187R 3,992,730

CLASS 5
109 3,992,731
263 3,992,732
337 3,992,733

CLASS 8
1A 3,993,434
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10.2 3,993,436
21B 3,993,437
21C 3,993,438
34 3,993,439
41B 3,993,440
41C 3,993,441
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14 3,992,739
310AA 3,992,738

CLASS 10
2 3,992,740

CLASS 11
1R 3,992,741

CLASS 12
1F 3,992,742
1R 3,992,743

CLASS 15
22R 3,992,744
56 3,992,745
307 3,992,746
321 3,992,747
397 3,992,748

CLASS 16
93D 3,992,749
95D 3,992,750
197 3,992,751

CLASS 17
1G 3,992,734
45 3,992,752

CLASS 19
12 3,992,753
66R 3,992,754
106R 3,992,755

CLASS 21
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126 3,993,444

CLASS 23
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259 3,993,452
259.5 3,993,447
262 3,993,448
277C 3,993,449
284 3,993,450

CLASS 24
75 3,992,756
77R 3,992,757
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182.7 3,993,446
191.2 3,993,453
194 3,993,454
200P 3,992,765
235 3,992,766
416 3,992,769
420.5 3,992,763
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628 3,992,773
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CLASS 30
34.2 3,992,775
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180 3,992,777
216 3,992,778
381 3,992,779

CLASS 32
10A 3,992,780
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CLASS 33
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CLASS 34
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CLASS 35
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44 3,992,787

CLASS 36
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CLASS 37
116 3,992,791

CLASS 40
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CLASS 43
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100 3,992,804

CLASS 44
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CLASS 46
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116 3,992,806
119 3,992,807

CLASS 47
1.1 3,992,808
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57.5 3,992,813
58 3,992,814
62 3,992,809
69 3,992,811
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CLASS 48
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209 3,993,458
212 3,993,459

CLASS 49
62 3,992,815
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406 3,992,817

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3 3,992,818
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125 3,992,821
237T 3,992,822
281R 3,992,823

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547 3,992,845
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743 3,992,847
745 3,992,848
760 3,992,853

CLASS 53
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27 3,992,849
112R 3,992,850
182R 3,992,851
196 3,992,852
209 3,992,855
306 3,992,857

CLASS 54
1 3,992,856

CLASS 55
92 3,993,460
178 3,993,461
204 3,993,462
306 3,993,463
480 3,993,464

CLASS 56
7 3,992,858
17.2 3,992,859
27.5 3,992,860
328R 3,992,861
370 3,992,862
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CLASS 57
34R 3,992,864
51 3,992,865
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156 3,992,867

CLASS 58
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CLASS 60
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CLASS 61
12 3,992,886
41A 3,992,887
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88 3,993,273

CLASS 62
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CLASS 63
2 3,992,901

CLASS 65
110 3,993,465

CLASS 66
8 3,992,902
177 3,992,903
190 3,992,904

CLASS 68
241 3,992,905

CLASS 70
18 3,992,906
222 3,992,907
370 3,992,908
379R 3,992,909

CLASS 71
33 3,993,466
86 3,993,467
90 3,993,468
92 3,993,469
94 3,993,470

CLASS 72
7 3,992,910
3,992,911
54 3,992,912
60 3,992,913
106 3,992,914
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234 3,992,915
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407 3,992,917
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447 3,992,919
452 3,992,920
457 3,992,921

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67.7 3,992,925
80 3,992,926
88E 3,992,927
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117.3 3,992,930
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136R 3,992,932
141A 3,992,933
143 3,992,934
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160 3,992,936
162 3,992,937
163 3,992,938
194M 3,992,939
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336.5 3,992,942
355R 3,992,943
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407R 3,992,946
421R 3,992,947
432R 3,992,948
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486 3,992,950
497 3,992,951
505 3,992,952
517B 3,992,953

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29 3,992,956
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231R 3,992,958
234 3,992,959
393 3,992,960
409 3,992,961
421R 3,992,962
574 3,992,963

CLASS 75
3 3,993,471
4 3,993,472
11 3,993,473
94 3,993,474
134F 3,993,475
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159 3,993,478
160 3,993,479
166C 3,993,480
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178A 3,993,482

CLASS 81
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CLASS 83
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322 3,992,975

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CLASS 89
7 3,992,976

CLASS 90
24R 3,992,977

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CLASS 92
157 3,992,980

CLASS 93
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52 3,992,982

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77 3,993,489
95 3,993,490

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478 3,992,985

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CLASS 101
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112 3,992,989
120 3,992,990
132 3,992,991
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176 3,993,000

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19 3,993,492
20 3,993,493
38.22 3,993,494
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288B 3,993,497
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3,993,499
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CLASS 108
53.1 3,993,168
108 3,993,002
112 3,993,003
124 3,993,004
156 3,993,005

CLASS 109
1R 3,993,006

CLASS 112
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217.1 3,993,008
235 3,993,009

CLASS 113
121C 3,993,010

CLASS 114
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221R 3,993,013
235R 3,993,014

CLASS 115
14 3,993,015

CLASS 116
2 3,993,016
112 3,993,017

CLASS 118
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52 3,993,018
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652 3,993,022
661 3,993,023
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CLASS 119
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29 3,993,027
51R 3,993,028

CLASS 123
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32R 3,993,030
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139BC 3,993,033
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190A 3,993,036
191S 3,993,037
196DB 3,993,038

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23R 3,993,039

CLASS 126
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271 3,993,041

CLASS 128
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1C 3,993,043
2S 3,993,044
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2.06E 3,993,048
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2.08 3,993,050
2.1B 3,993,046
24R 3,993,051
46 3,993,052
64 3,993,053
66 3,993,054
84B 3,993,055
89R 3,993,056
130 3,993,057
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214F 3,993,061
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214R 3,993,062
215 3,993,063
218A 3,993,064
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286 3,993,074
303.1 3,993,075
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329A 3,993,077

334R 3,993,078
347 3,993,079
350R 3,993,080
351 3,993,081

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84B Re.29,042

CLASS 132

45R 3,993,083
73 3,993,084
92A 3,993,085

CLASS 134

57R 3,993,086

CLASS 135

3R 3,993,087
67 3,993,088

CLASS 136

89 3,993,505
3,993,506

CLASS 137

116.3 3,993,089
195 3,993,090
269 3,993,091
454.2 3,993,092
484.6 3,993,093
588 3,993,094
596.1 3,993,095
599.2 3,993,096
604 3,993,097
624.14 3,993,098
625.48 3,993,099
628 3,993,100
831 3,993,101

CLASS 138

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3,993,103

CLASS 139

155 3,993,104
291C 3,993,105

CLASS 140

71R 3,993,106
71.5 3,993,107
105 3,993,108
123.6 3,993,109

CLASS 141

4 3,993,110
90 3,993,111
392 3,993,112

CLASS 144

194 3,993,113

CLASS 148

1.5 3,993,509
6.2 3,993,510
172 3,993,511
175 3,993,512
3,993,513

CLASS 149

19.5 3,993,514

CLASS 152

340 3,993,114

CLASS 156

3 3,993,515
3,993,516
13 3,993,517
62.6 3,993,518
73.5 3,993,519
94 3,993,520
96 3,993,521
137 3,993,522
148 3,993,523
155 3,993,524
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202 3,993,526
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380 3,993,529
405 3,993,530
428 3,993,531
580 3,993,532
613 3,993,533
617SP 3,993,534

CLASS 157

13 3,993,115
3,993,116

CLASS 159

47R 3,993,535
48R 3,993,536

CLASS 162

198 3,993,537

CLASS 164

43 3,993,117
278 3,993,118
330 3,993,119

CLASS 165

26 3,993,120
29 3,993,121
45 3,993,122
80 3,993,123
89 3,993,124
153 3,993,125
173 3,993,126

CLASS 166

66 3,993,127
216 3,993,128
252 3,993,131
261 3,993,132
272 3,993,133
293 3,993,134
303 3,993,135
314 3,993,136
319 3,993,129
330 3,993,130

CLASS 169

46 3,993,137
61 3,993,138
62 3,993,139

CLASS 171

17 3,993,140
63 3,993,141
101 3,993,142

CLASS 172

22 3,993,143
59 3,993,144

CLASS 173

12 3,993,145

CLASS 174

15WF 3,993,858
52R 3,993,859
6968476 3,993,860

CLASS 174

206 3,993,146
344 3,993,147

CLASS 176

11 3,993,538
19R 3,993,539
37 3,993,540
3,993,541
3,993,542

CLASS 177

50 3,993,148
163 3,993,149
211 3,993,150
255 3,993,151

CLASS 178

5.6 3,993,861
6 3,993,862
6.6DD 3,993,863
7.1 3,993,864
7.6 3,993,865
7.81 3,993,866
58R 3,993,867
66R 3,993,868

CLASS 179

1A 3,993,869
15BS 3,993,870
18ES 3,993,872
3,993,873
18GF 3,993,871
22 3,993,874
84VF 3,993,875
90B 3,993,876
3,993,877
100.1DR 3,993,878
156A 3,993,879
170D 3,993,880

CLASS 180

44R 3,993,152
69.1 3,993,153
77R 3,993,154
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98 3,993,156
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36A 3,993,159
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CLASS 184

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CLASS 187

9R 3,993,166

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72.4 3,993,171
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138 3,993,173
344 3,993,174

CLASS 192

3.57 3,993,175
45 3,993,176
3,993,177
64 3,993,178

CLASS 195

29 3,993,543
80R 3,993,544
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CLASS 197

19 3,993,179
49 3,993,180
167 3,993,181
168 3,993,182

CLASS 198

382 3,993,187
429 3,993,183
461 3,993,188
465 3,993,189
533 3,993,184
806 3,993,186
813 3,993,185

CLASS 200

76 3,993,881
220 3,993,882
283 3,993,883
295 3,993,884

CLASS 202

99 3,993,546

CLASS 203

9 3,993,547

CLASS 204

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158HA 3,993,550
159.12 3,993,552
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159.14 3,993,551
159.22 3,993,549
162XN 3,993,554
163R Re.29,044
272 3,993,653

CLASS 206

229 3,993,190
386 3,993,191
515 3,993,192

CLASS 208

11LE 3,993,555
75 3,993,556
111 3,993,557

CLASS 209

74M 3,993,193
81R 3,993,194

CLASS 210

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54 3,993,559
94 3,993,560
131 3,993,561
189 3,993,562
221M 3,993,563
360A 3,993,564
396 3,993,565
433M 3,993,566
498 3,993,567
527 3,993,568

CLASS 211

7 3,993,195
49D 3,993,196
116 3,993,205
119.09 3,993,197

CLASS 212

127 3,993,198

CLASS 214

1R 3,993,199
14 3,993,200
16.4A 3,993,201
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45 3,993,203
89 3,993,204
138C 3,993,206
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10.55F 3,993,886
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99 3,993,887

CLASS 220

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3.6 3,993,212
9LG 3,993,213
218 3,993,214

CLASS 221

75 3,993,215
93 3,993,216
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61.11E 3,993,893
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151.1 3,993,889
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175 3,993,891

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481 3,993,281

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94	3,993,332
344	3,993,334

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89	3,993,341

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1A	3,993,342
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90	3,993,347
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121	3,993,370
238	3,993,371

CLASS 310

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71	3,993,373
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197	3,993,375
228	3,993,376
263	3,993,377
293	3,993,378

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198	3,993,922
330	3,993,923

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3.5	3,993,924
5.38	3,993,925
10	3,993,926
39	3,993,927
241P	3,993,928
	3,993,929
397	3,993,930
408	3,993,931

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20	3,993,379

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62	3,993,933
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101C	3,993,935
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123	3,993,937
230	3,993,938
246	3,993,939

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207B	3,993,940
264	3,993,941
317	3,993,942

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5	3,993,943
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CLASS 324

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28R	3,993,949
30B	3,993,945
34D	3,993,946
60R	3,993,947
71CP	3,993,948
109	3,993,950
119	3,993,951

CLASS 325

13	3,993,952
38A	3,993,953
43	3,993,954
308	3,993,955
320	3,993,956

CLASS 328

38	3,993,957
109	3,993,958
167	3,993,959

CLASS 330

63	3,993,960
149	3,993,961

CLASS 331

18	3,993,962
94.5H	3,993,963
	3,993,964
94.5T	3,993,965

CLASS 333

21R	3,993,966
70CR	3,993,967
80R	3,993,968
98P	3,993,969

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5	3,993,970
202	3,993,971
220	3,993,972

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17CF	3,993,381
	3,993,384
17LC	3,993,382
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50R	3,993,386
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59R	3,993,387
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98	3,993,392
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246	3,993,397

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324M	3,993,990
324R	3,993,991
347SY	3,993,993
347C	3,993,992

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5CM	3,993,994
7ED	3,993,995
17.7	3,993,996
112CA	3,993,997
744	3,993,998
854	3,993,999

CLASS 346

160	3,994,000

CLASS 350

3.5	3,993,398
	3,993,399
96C	3,993,400
285	3,993,402
320	3,993,401

CLASS 351

178	3,993,403

CLASS 352

157	3,993,404

CLASS 353

27A	3,993,405

CLASS 354

51	3,994,001
86	3,994,002
173	3,994,003
202	3,994,004
206	3,994,005
212	3,994,006
267	3,994,007
295	3,994,008

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8	3,993,406

CLASS 356

1	3,993,407

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96	3,993,408
199	3,993,409

CLASS 403

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271	3,993,411

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28	3,993,412
128	3,993,413

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93R	3,993,415

CLASS 417

360	3,993,416

CLASS 418

137	3,993,417
206	3,993,418

CLASS 423

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184	3,993,729
225	3,993,730
239	3,993,731
286	3,993,732
313	3,993,733
315	3,993,734
321R	3,993,735
321S	3,993,736
325	3,993,737
448	3,993,738
460	3,993,739
598	3,993,740

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9	3,993,742
12	3,993,743
70	3,993,744
71	3,993,745
78	3,993,746
88	3,993,747
118	3,993,748
122	3,993,749
128	3,993,750
	3,993,751
	3,993,752
129	3,993,753
176	3,993,754
177	3,993,755
180	3,993,756
195	3,993,757
244	3,993,758
246	3,993,759
250	3,993,760
	3,993,761
251	3,993,762
267	3,993,763
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269	3,993,765
270	3,993,766
271	3,993,770
272	3,993,767
273	3,993,768
	3,993,769
279	3,993,771
285	3,993,772
305	3,993,773
	3,993,774
312	3,993,775
316	3,993,776
329	3,993,777
330	3,993,778
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331	3,993,779
343	3,993,781
346	3,993,782

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363	3,993,424
370	3,993,425
371	3,993,426
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521	3,993,428

CLASS 426

18	3,993,783
49	3,993,784
69	3,993,785
99	3,993,786
176	3,993,507
243	3,993,788
250	3,993,789
277	3,993,790
436	3,993,791
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565	3,993,793
574	3,993,794
618	3,993,795
630	3,993,796

CLASS 427

44	3,993,798
53	3,993,799
64	3,993,797
74	3,993,800
98	3,993,801
	3,993,802
117	3,993,803
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140	3,993,804
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206	3,993,806
229	3,993,807
377	3,993,808

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35	3,993,810
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	3,993,812
38	3,993,813
40	3,993,814
	3,993,815
45	3,993,816
64	3,993,817
114	3,993,818
136	3,993,819
167	3,993,820
208	3,993,821
213	3,993,822
	3,993,823
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236	3,993,828
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255	3,993,829
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307	3,993,831
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311	3,993,833
373	3,993,834
378	3,993,835
383	3,993,836
391	3,993,837
403	3,993,838
413	3,993,839
	3,993,840
418	3,993,841
421	3,993,842
422	3,993,843
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433	3,993,845
447	3,993,846
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474	3,993,850
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921	3,993,852

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	180	242,444
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		242,450
	60	242,451
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	78	242,458
	149	242,459
	150	242,460
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DESIGN PATENTS

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		242,501			242,502			242,479		242,423			242,488	42	:	242,414
6	:	242,402	8	:	242,424			242,485		242,429	39	:	242,407			242,418
		242,403			242,426			242,489		242,447			242,408			242,435
		242,417			242,465	18	:	242,474		242,462			242,409			242,439
		242,436	9	:	242,401	22	:	242,478		242,464			242,412			242,463
		242,440			242,460	24	:	242,459		242,469			242,415	44	:	242,431
		242,452			242,494	25	:	242,467		242,473			242,416	46	:	242,438
		242,456			242,499	26	:	242,410		242,484			242,421	48	:	242,434
		242,458	12	:	242,404	27	:	242,498		242,490			242,433			242,451
		242,477			242,442	33	:	242,441		242,492			242,443			242,497
		242,480	15	:	242,413	34	:	242,457	37	: 242,411	40	:	242,446	53	:	242,400
		242,491	17	:	242,430	36	:	242,405		242,481			242,482	56	:	242,437
		242,493			242,432			242,406		242,486						

PLANT PATENTS

6	:	3,983			3,984						

U. S. GOVERNMENT PRINTING OFFICE : O - 1976

U.S. DEPARTMENT OF COMMERCE
Elliot L. Richardson, Secretary

PATENT AND TRADEMARK OFFICE
C. Marshall Dann, Commissioner